

The oral cavity hygiene as the basic element of the gingival recession prophylaxis

Kozłowska M¹, Wawrzyn-Sobczak K², Karczewski JK¹, Stokowska W²

¹ Department of Hygiene and Epidemiology, Medical University of Białystok, Poland

² Department of Conservative Dentistry and Periodontal Diseases, Medical University of Białystok, Poland

Abstract

The purpose of the study was the evaluation of the dental plaque and the influence of determined hygienic factors on gingival recession occurrence in 455 students of The Medical University of Białystok. All the subjects were examined in artificial light, with the use of the probe, mirror, and parodontometer. The distribution of stained dental deposits were estimated with the use of the plaque index according to Quigley and Hein. Moreover, the students were to fill a survey of their own project concerning hygienic habits. The results underwent statistical analysis.

The dental plaque was not present in 71 people. Gingival recession was revealed in 134 out of 455 subjects. The majority of medical students brushed their teeth twice a day, using medium hard toothbrush or electric toothbrush with appropriate movements and medium strength while brushing. The frequency of brushing the teeth, hardness of the toothbrush, the use of electric toothbrush, the movements during brushing the teeth, the strength of brushing, the frequency of toothbrush change, the age, and sex have significant influence on the number of recession.

The increase in the gingival recession in students is connected with: large pressure on the brush while toothbrushing, too frequent brushing and toothbrush change, the use of hard toothbrush and additional hygienic items, movements while brushing, the age (the number of recession elevates with the age), and sex (women showed more recession than men).

Key words: gingival recession, risk factors for gingival recession, multiple recession.

Introduction

An inappropriate way of toothbrushing is the main causative factor responsible for gingival recession. There are a few elements that should be taken into consideration: inappropriate way of brushing the teeth, the use of too hard a brush, the frequency of brushing, and too much strength used while brushing the teeth [1-3]. These factors cause a repetitive gingival trauma, which leads to epithelial trabecula penetration to damaged gingival tissues, epithelial surface collapse and recession.

Gingival recession is a pathology during which the gingiva is translocated from the boundary of the enamel – cement connection to the apex [4]. Then, the tooth root surface is exposed which in turns causes the increased sensitivity to nutritional and termic stimuli and the possibility of root caries and non-carious defects at the neck. It means dentition esthetics defect and teeth loss fear for a patient.

Clinical studies confirmed the occurrence of this type of recession in people with strict oral cavity hygiene (i.e. those who do not reveal dental plaque). Pro-health awareness presented by medical students sometimes leads to “too ideal” hygiene, which can be displayed by too frequent and too long brushing.

It has been proven that gingival recession occurs both in people who care about oral cavity hygiene and those who do not [5]. Lack of hygiene induces inflammatory reaction leading to connective tissue attachment loss at the surface of the teeth and recession [6].

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ADDRESS FOR CORRESPONDENCE:
Department of Hygiene and Epidemiology
Medical University of Białystok, Poland
Tel/fax: +48 748 55 60

Tabela 1. The dental plaque index according to Quiglen and Hein in 134 subjects with diagnosed gingival recession

Sex Number of subjects	The scale of dental plaque evaluation according to Quiglen and Hein									
	0	1	2	3	4	5	2+3	3+4	3+5	4+5
Women 100	59 83.1%	8 66.7%	2 66.7%	11 64.7%	3 42.9%	0 0%	2 100%	9 69.2%	5 83.3%	1 50%
Men 34	12 16.9%	4 33.3%	1 33.3%	6 35.3%	4 57.1%	1 100%	0 0%	4 30.8%	1 16.6%	1 50%
Total 134	71	12	3	17	7	1	2	13	6	2

Material and methods

The examined group consisted of 455 students of The Dentistry Department and The Medical Department of The Medical University of Białystok. The age of the subjects ranged from 18 to 32 years.

The group was examined in clinical rooms of The Institute of Conservative Dentistry and Parodontium Diseases of The Medical University of Białystok. The examination took place in artificial light with the use of the dental probe, mirror, and parodontometer.

After staining the tooth surfaces with Butler’s liquid, the distribution of stained deposits were assessed using the plaque index according to Quigley and Hein. The criteria for the evaluation were as follows: 0 – lack of plaque; 1 – single plaque islets; 2 – plaque trabeculas at the edge of gingival; 3 – plaque covering 1/3 of the tooth surface at the neck; 4 – plaque covering 2/3 of the tooth surfaces at the neck; 5 – the plaque covers the whole surface of the examined tooth. In order to facilitate the evaluation and obtain precise distribution of the plaque, the following additional determinants were used: 2+3 – the plaque trabeculas occurring at the edge of the gingival and simultaneously covering the 1/3 of the tooth surface at the neck; 3+4 – the plaque extends simultaneously in the 1/3 of the tooth surface at the neck and covers 2/3 of the tooth surface; 3+5 – the plaque extends simultaneously in the 1/3 of the tooth surface at the neck and covers the whole surfaces of the examined teeth; 4+5 – the plaque covers 2/3 of the tooth surface and simultaneously the whole surfaces of the teeth.

After the examination, the students filled the survey concerning hygienic habits.

The results were analyzed statistically (Mann-Whitney test and Pearson Chi² test, Kendall tau coefficient, the model of multiple regression).

Results

In 134 subjects with recession the dental plaque was stained and the case history was taken. The students also filled the survey concerning hygienic habits (Tab. 1).

The examination and staining the plaque were not announced, the students were examined after their classes thus they had no opportunity to brush their teeth. The dental plaque was not observed in 71 patients with recession. Twelve cases

(8 women and 4 men) showed code 1, single islets of the dental plaque. Code 2 was seen in 3 students; the plaque trabeculas at the edge of the gingival, mainly the lingual and palatal surfaces of the lateral upper and lower teeth. In patients with diagnosed gingival recession – the labial surfaces at the teeth with recession were also affected.

Butler’s fluid stained the plaque that covered 1/3 of the tooth surface at the neck (code 3) in 17 examined students. Those were mainly lateral teeth, premolars and molars, and more often lower at the lingual side than the upper ones; and at the palatal side in the upper teeth.

However, the dental plaque covering the 2/3 of the tooth surface at the neck (code 4) occurred only in 7 people and it was mainly visible in the lingual surface of the lower incisors and canines.

Only one person (a man) had the plaque covering the whole surfaces of the frontal teeth at the labial sides and the 8th teeth on both surfaces (code 5).

In the evaluation of the oral cavity hygiene it was difficult to determine the code of the plaque occurrence in 21 people. Thus, the combined evaluation was incorporated: code 2+3, 3+4 and 3+5, 4+5. The group revealed bad oral hygiene with 2 women with the dental plaque of the code 2+3, 13 people presented the code 3+4, 6 – the code 3+5, and one man and one woman the code was 4+5.

The gingival recession was observed in 134 subjects out of 455 students (29.45%), more in women than in men (31.74% and 24.28%, respectively). The pathological condition concerned mainly the tooth labial or buccal surfaces. The ratio of the percentage of teeth with gingival recession to the number of all examined teeth was approximately 5.09%.

About 4.84 of the exposed surface of the root was to one examined student with the mean recession number in women was 4.74 and in men was 5.15. The most common localization, in case of subjects with gingival recession, were premolars and the lower canines and incisors.

On the basis of the survey results (Tab. 2), it was stated that the majority of medical students brushed their teeth twice a day (219 subjects) while most of those with diagnosed gingival recession – 3 times a day (73 people). The data are statistically significant. The medium toothbrushes were used by 343 students (96 with the gingival recession) and electric brushes, as the basic everyday oral hygiene, were used by 347 students and only 31 with the gingival recession. There was no correlation stated between the kind of toothbrush and the gingival

Table 2. The variables influencing gingival recession

Factors affecting gingival recession		Number of subjects in groups	Number and percentage (%) of subjects with gingival recession in groups
Frequency of toothbrushing	1	20	4 (20%) **
	2	219	57 (26%)
	3	216	73 (33%)**
Kind of toothbrush	Hard	57	22 (38.6%)*
	Medium	343	96 (28%)*
	Soft	55	16 (29.9%)
Electric toothbrush	Yes	347	31 (8.9%)
	No	108	103 (95.4%)
Movements while toothbrushing	Regular	410	126 (30.7%)*
	irregular	45	8 (17.7%)*
Strength of brushing	Strongly	107	44 (41.1%)**,**
	Average	340	87 (25.6%***)
	Weakly	8	3 (37.5%)**
Frequency of toothbrush change	<3 months	117	49 (41.9%***)
	every 3 months	237	63 (26.6%)
	>3 months	101	22 (21.8%***)
Additional hygienic items	Yes	340	130 (38.2%***)
	No	115	4 (3.5%***)

*p<0.05 ** p<0.001 ***p<0.0001

recession occurrence. The majority (410 subjects) made normal movements while brushing the teeth. However, traumatic movements (horizontal ones) were used by 45 students and 8 ones with the gingival recession. The data are statistically significant. It was also determined that most of the students chose medium strength while brushing the teeth (340 subjects out of whom 87 with the diagnosed gingival recession), more strength was used by 107 students – 44 with the diagnosed gingival recession).

The statistical analysis showed a very strong correlation between the strength of brushing and the recession (the bigger strength, the more frequent cases of the recession observed). We learnt that 237 people changed their toothbrushes every 3 months (63 subjects with the gingival recession) and more often than every three months – 117 students and 49 people with the gingival recession. The data show statistical dependence. Additional hygienic items (dental floss, toothpick, mouthwash) were used by the majority of students.

In the construction of multiple regression model (Tab. 3), the number of recession is considered the dependent variable and the frequency of brushing, the hardness of toothbrush, the use of electric toothbrush, movements while brushing, the strength of pressure, the frequency of toothbrush change as well as the sex and the age were independent variables. F test shows that independent variables have a great impact on the number of recession (F=33.556; p<0.01; R²=0.041; standard estimation error: 2.77).

The value of regression coefficient B, the estimation error for B and the level p were given for each independent variable in Tab. 3. The frequency of brushing teeth (each additional brushing gave the increase of recession number by 0.08), the hardness of toothbrush (while using medium and soft ones the number of recession decreased by 0.03), the use of electric brush caused

Table 3. Multiple regression of analyzed factors

Variable	Regression coefficient B	SE B	P value
Frequency of toothbrushing	0.083	0.246	p=0.0989
Kind of toothbrush	-0.031	0.478	p=0.0513
Electric toothbrush	-0.031	0.486	p=0.521
Movements while toothbrushing	0.095	0.047	p<0.05
Strength of brushing	-0.156	0.047	p<0.05
Frequency of toothbrush change	-0.126	0.049	p<0.05
Age	0.141	0.068	p<0.05
Sex	-0.429	0.285	p=0.357

the drop in recession number by 0.03, horizontal movements increased the recession by 0.09, light pressure used caused recession decrease by 0.16, the frequency of brush change (if the brush was changed every 3 months or more seldom, the number of recession dropped by 0.13), the age (the increase was observed by 0.14), and sex (recession was higher in women than in men) have all the great impact on the number of recession.

Discussion

Numerous epidemiological reports on the gingival recession have pointed to the fact that that pathology became society-wide. National and foreign literature has given the basis to state that last years caused the number of the gingival recession to increase in young people [1,7-9]. Checchi et al. [3] showed the highest frequency of recession in Italian students (64%) while

significantly lower percentage (35%) was observed in dentistry students of Medical Universities in Wrocław and Gdańsk [8,9] and the lowest value presented the students in Białystok (29.4%).

The students evaluated in our study had a very high oral hygiene. Thus, hygiene neglect can be hardly considered to be an essential cause of the gingival recession. Moreover, the survey revealed differences between the students of dentistry and medical ones as far as professional care of the oral cavity is concerned.

The vast majority of dentistry students use additional hygienic items regularly. Unfortunately, that is the group of subjects that developed “too ideal” a hygiene due to pro-healthy consciousness. And that can not only influence the occurrence of recession but also non-carrietic defect appearance, which can disturb dentition esthetics.

The model of multiple regression indicates the effect of pressure on the brush, brushing techniques, the brush hardness, frequency of brushing, and irregular change of the brush on the increase of recession number. Checchi and Kozłowski [3,9] also showed the relationship between the oral cavity hygiene and recession.

Our as well as other authors’ observation have presented the relation between improper and exaggerated oral hygiene and the gingival recession occurrence. Those factors, although significant, are not decisive as for all etiopathological conditions of recession. We should not forget about such factors as abnormal setting of the teeth in the arch, occlusion defects, orthodontic treatment, surgical procedures of parodontium, traumatic occlusion, genetic and anatomical conditions, smoking, and stress that have negative influence on parodontium tissues.

Nowadays, the problem of the gingival recession becomes for a dentist a serious society-wide problem, which requires individual and, which is most important, cautious management of each case. The examination of all possible recession factors, their elimination or at least diminishment is of great importance

in the treatment. Such measures, sometimes with surgical intervention, can provide permanent effect of therapy.

Conclusions

The increase in the gingival recession in students is connected with: large pressure on the brush while toothbrushing, too frequent brushing and toothbrush change, the use of hard toothbrush and additional hygienic items, movements while brushing, the age (the number of recession elevates with the age), and sex (women showed more recession than men).

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