

# ASSESSMENT OF ORAL HYGIENE IN THE PREVENTION OF GINGIVITIS AMONG STUDENTS OF THE FACULTY OF DENTISTRY AND OTHER FACULTIES OF THE UNIVERSITY OF SARAJEVO

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## ABSTRACT

**InThe aim** of this study was to analyze oral hygiene maintenance habits and the correctness of applying oral hygiene methods among students of the Faculty of Dentistry and students of other faculties at the University of Sarajevo, with focus on assessing the importance of oral hygiene in the prevention of gingivitis.

**Materials and methods:** The study included 30 students from the Faculty of Dentistry and 30 students from other faculties. The age of participants ranged from 21 to 26 years. All participants signed informed consent for voluntary participation prior to the examination. Data were recorded on specially designed forms. Inclusion criteria were systemic health and absence of ongoing therapy. All participants answered questions regarding harmful habits, oral hygiene practices, and regular dental visits. A clinical examination of the gingiva was performed, including the assessment of periodontal indices and diagnostic tests.

**Results:** Dental students demonstrated better oral hygiene habits and gingival health compared to students from other faculties. Plaque, calculus, and gingival index values were lower among dental students, while signs of gingival inflammation—such as redness, smooth surface, and a positive Pitting test—were more common among students of other faculties. Dental students more frequently used interdental cleaning aids and regularly visited the dentist, indicating a higher level of knowledge and awareness regarding oral health.

**Conclusion:** The results confirm that education plays a key role in maintaining oral health and highlight the need for preventive and educational programs even among populations not belonging to the dental profession.

**Keywords:** student, oral hygiene, harmful habits.

## Introduction

Gingivitis caused by poor oral hygiene, along with dental caries, is among the most common diseases in school-aged and student populations [1, 2]. Numerous reports from various countries describe studies on oral health, knowledge, and behaviors among dental students [3, 4, 5]. However, few studies have assessed the awareness of dental students regarding gingival health by comparing their clinical parameters and self-assessments with those of students from other faculties [1].

Plaque accumulation along the gingival margin leads to gingival inflammation [6, 7]. This inflammatory condition, known as gingivitis, is characterized by gingival redness, edema, and bleeding on probing, without visible loss of alveolar bone or supporting tooth structures [8, 9]. Based on epidemiological and experimental studies, dentists recommend effective oral hygiene to control dental plaque and maintain optimal oral health [10].

Educating students about their oral health increases awareness of oral hygiene as the most important measure in preventing gingivitis [11]. This research focuses on assessing the level of oral hygiene among students of the Faculty of Dentistry compared to students of other faculties at the University of Sarajevo, with special emphasis on the importance of oral hygiene education in the prevention of gingivitis and further progression of periodontal diseases.

The aim of the study was to analyze oral hygiene maintenance habits and the correctness of applying oral hygiene methods among students of the Faculty of Dentistry and students from other faculties of the University of Sarajevo, with special emphasis on evaluating the importance of oral hygiene in the prevention of gingivitis.

## Materials and Methods

The study included 30 students of the Faculty of Dentistry and 30 students from other faculties of the University of Sarajevo. The research was approved by the Ethics Committee of the Faculty of Dentistry with the Dental Clinical Center in Sarajevo, no: 02-3-4-19-2-3/2024, dated 14.02.2024.

The age of participants ranged from 20 to 26 years. All participants signed informed consent for voluntary participation prior to the examination. Data collected during the examination were entered into specially designed forms created for this study, without recording participants' names.

The research was conducted during student practical sessions in the summer semester of the 2023/2024 academic year. Inclusion criteria were:

- > systemic health,
- > no chronic disease therapy,
- > no antibiotic use in the past 6 months,
- > no professional dental cleaning in the past 6 months.

Exclusion criteria were:

- > presence of systemic disease,
- > current use of any therapy,
- > antibiotic use within the past 6 months,
- > professional dental cleaning within the past 6 months.

This study was designed as a cross-sectional study.

All participants answered questions regarding harmful habits, oral hygiene practices, and regular dental visits. A clinical gingival examination was performed, including the assessment of periodontal indices and diagnostic tests.

## Statistical Analysis

The data were processed using standard statistical methods with the SPSS statistical software package (Statistical Package for Social Sciences), version 21.0. Results were presented as mean value ( $\bar{X}$ ) and standard deviation (SD), as well as absolute numbers and percentages. The Shapiro–Wilk test was used to assess deviations from normal distribution. Since numerical variables followed a normal distribution, the results were analyzed using the student's t-test. The chi-square test or Fisher's exact test was used to analyze the relationship between categorical variables. A p-value of  $<0.05$  was considered statistically significant.

**Table 1.**  
**Demographic characteristics and oral hygiene in the examined groups**

Variable	Group 1 – students from other faculties	Group 2 – students of the faculty of Dentistry	p
<b>Gender</b>			
Male	10 (33,3%)	11 (36,1%)	0,662
Female	20 (66,7%)	19 (61,3%)	
<b>Year of study</b>			
First year	5 (16,7%)	0 (0,0)	–
Second year	4 (13,3%)	0 (0,0)	
Third year	10 (33,3%)	0 (0,0)	
Fourth year	5 (16,7%)	10 (33,3%)	
Fifth year	6 (20,0%)	7 (22,6%)	
Sixth year	0 (0,0)	14 (45,2%)	
<b>Oral hygiene</b>			
Toothbrush and toothpaste	8 (26,7%)	0 (0,0%)	–
Toothbrush, toothpaste, and dental floss	8 (25,8%)	9 (30,0%)	
Toothbrush, toothpaste, and interdental brushes	3 (10,0%)	7 (22,6%)	
Toothbrush, toothpaste, and mouthwash	4 (13,3%)	1 (3,2%)	
All combined	6 (20,0%)	15 (48,4%)	
<b>Frequency of brushing</b>			
1x	1 (3,3%)	1 (3,2%)	–
2x	19 (61,3%)	21 (70,0%)	
3x	6 (20,0%)	9 (29,0%)	
3x	2 (6,7%)	2 (6,6%)	
<b>4 Brushing duration</b>			
Up to 3 minutes	22 (71,0%)	23 (76,7%)	–
From 3 to 5 minutes	5 (20,0%)	8 (25,6%)	
Longer than 5 minutes	1 (3,3%)	1 (3,2%)	
<b>Dental visits</b>			
As needed	7 (23,3%)	4 (12,9%)	0,233
Every 6 months	6 (20,0%)	13 (41,9%)	
Every 3 months	12 (40,0%)	8 (25,8%)	
Once a year	5 (20,0%)	6 (19,4%)	
<b>Smoking</b>			
	12 (40,0%)	9 (29,0%)	0,367

The results are presented as absolute numbers (N) and as percentage values (%).

**Table 2.**  
**Plaque index, calculus index, and gingival bleeding index in the examined groups**

Variable	Group 1 – students from other faculties	Group 2 – students of the faculty of Dentistry	p
Plaque index	1,40±0,14	0,64±0,09	<0,001
Calculus index	1,40±0,20	0,58±0,09	0,004
Gingival bleeding index	2,03±0,23	1,03±0,17	0,002

The results are presented as mean ± standard deviation ( $\bar{X} \pm SD$ ).

## Results

The plaque index in the group of students from other faculties was  $1.4 \pm 0.14$ , which was statistically significantly higher than the plaque index value in the group of dental students,  $0.64 \pm 0.09$  ( $p < 0.001$ ). The calculus index in the group of students from other faculties was  $1.40 \pm 0.20$ , which was statistically

significantly higher than the calculus index value in the group of dental students,  $0.58 \pm 0.09$  ( $p = 0.004$ ).

The gingival bleeding index in the group of students from other faculties was  $2.03 \pm 0.23$ , which was statistically significantly higher than the value recorded in the group of dental students,  $1.03 \pm 0.17$  ( $p = 0.002$ ) (Table 2).

**Table 3.**  
**Results of dental examination and oral hygiene assessment**

Variable	Group 1 – students from other faculties	Group 2 – students of the faculty of Dentistry	p
<b>Gingival color</b>			
Normal	10 (33,3%)	24 (77,4%)	0,001
Intensely red	5 (16,7%)	0 (0,0%)	
Mildly red	15 (50,0%)	7 (22,6%)	
<b>Gingiva</b>			
Stippled (orange peel)	7 (23,3%)	22 (71,0%)	–
Smooth, shiny	20 (66,7%)	9 (29,0%)	
Enlarged	3 (10,0%)	0 (0,0%)	
Positive Pitting Test	14 (46,7%)	3 (9,7%)	
<b>Student self-assessment</b>			
Excellent	4 (13,3%)	11 (35,5%)	0,001
Good	23 (76,6%)	17 (54,8%)	
Insufficient	3 (10,0%)	2 (6,3%)	
Poor	0 (0,0%)	1 (3,2%)	
<b>Assessment by the dentist</b>			
Excellent	0 (0,0%)	11 (35,5%)	–
Good	14 (46,7%)	19 (61,3%)	
Insufficient	14 (46,7%)	1 (3,2%)	
Poor	2 (6,7%)	0 (0,0%)	

The results are presented as absolute numbers (N) and percentages (%).

**Normal gingival color** in the group of students from other faculties was recorded in 10 participants (33.3%), while in the group of dental students it was recorded in 24 participants (77.4%).

**Intensely red gingival color** in the group of students from other faculties was present in 5 participants (16.7%), whereas no such cases were recorded among dental students.

**Mildly red gingival color** was observed in 15 participants (50.0%) in the group of students from other faculties, compared to 7 participants (22.6%) in the group of dental students. The difference in gingival color between the examined groups was statistically significant ( $p = 0.001$ ).

**Stippled (orange peel) gingiva** was most commonly recorded in the group of dental students, with a frequency of 22 (71.0%), whereas **smooth, shiny gingiva** was predominant in the group of students from other faculties, recorded in 20 (66.7%).

A **positive Pitting test** was found in 14 participants (46.7%) in the group of students from other faculties, compared to only 3 participants (9.7%) in the group of dental students. The difference in the frequency of positive Pitting test findings between the groups was statistically significant ( $p = 0.001$ ).

**Good oral hygiene (self-assessed)** was most frequently reported among students from other faculties, recorded in 23 participants (76.6%), whereas in the group of dental students it was reported in 17 participants (54.8%).

**Good and insufficient oral hygiene assessed by the dentist** was most frequent in the group of students from other faculties, recorded in 14 participants (46.7%).

**Good oral hygiene assessed by the dentist** was most frequent in the group of dental students, recorded in 19 participants (61.3%).

## Discussion

The results of this study showed that students of the Faculty of Dentistry exhibited significantly better oral hygiene parameters and periodontal status compared to students from other faculties. Plaque index, calculus index, and gingival bleeding index values were significantly lower among dental students ( $p < 0.001$ ;  $p = 0.004$ ;  $p = 0.002$ ), indicating a higher level of

awareness regarding the importance of regular oral hygiene and the prevention of periodontal diseases.

These findings are consistent with previous studies demonstrating that dental students, due to their education and professional orientation, pay more attention to oral health and proper hygiene techniques [12, 13].

Rahman and Kawas reported that dental students in the United Arab Emirates had better oral health and a lower prevalence of gingivitis compared to the general population, which was attributed to greater education and knowledge of periodontal disease etiology [5].

Similar results were reported by Khami et al., who noted that dental students develop positive habits and awareness of oral hygiene early in their studies, while students from other faculties often maintain oral hygiene irregularly and without adequate tools [4].

Our findings, showing that almost half of dental students (48.4%) used all available oral hygiene aids (toothbrush, dental floss, interdental brushes, and mouthwash), support this trend.

In contrast, among students from other faculties, the basic form of hygiene—using only a toothbrush and toothpaste—was dominant (26.7%), indicating limited awareness of the importance of interdental cleaning.

This pattern aligns with the findings of AlGhamdi et al., who showed that oral hygiene habits among high school students in Saudi Arabia are generally poor, with a high prevalence of gingivitis and early periodontal disease [12, 13].

Plaque and calculus index values in our study were directly related to poorer hygiene habits and lower levels of knowledge on periodontal diseases, consistent with findings by Baiju et al., who identified low education and irregular brushing as predictors of early periodontal changes in adolescents [11]. These results further confirm the etio-pathogenic role of dental plaque and calculus in the development of gingival inflammation, which has been described in classical studies by Löe et al. (10) and in modern research by Kornman [6] and Trombelli et al. [9]. Clinical analysis of gingival conditions showed that normal gingival color and texture (“orange peel”) were significantly more frequently recorded among dental

students, whereas red and smooth gingiva, as well as positive Pitting test results, were considerably more common in students from other faculties ( $p = 0.001$ ).

These differences indicate the presence of inflammatory changes in individuals with poorer oral hygiene and confirm the association between clinical parameters and plaque and gingival bleeding indices. Similar correlations were reported by Krüger et al., who found that hygiene habits, brushing frequency, and regular dental check-ups are key factors in maintaining gingival health [2].

An important finding of this study is that students from other faculties most often visited the dentist "as needed" (23.3%), while dental students visited the dentist more regularly, every three to six months. This corresponds with findings by Kawamura et al., who showed that cultural and educational factors significantly influence dental habits and behaviors among students in various countries [4].

No significant difference in brushing frequency was observed between the groups, suggesting that frequency alone is not sufficient if technique and additional hygiene aids are not properly used. Baser et al. also emphasized the discrepancy between self-perceived hygiene and objective clinical findings, which our results confirm—students from other faculties most frequently rated their own hygiene as "good," although clinical measurements showed higher levels of plaque, calculus, and gingival bleeding [1].

In a broader context, our findings confirm that education plays a crucial role in the prevention and control of periodontal disease. Regular education, practical training in proper oral hygiene, and motivation for routine dental check-ups should be part of preventive programs even for non-dental students. This could help reduce the prevalence of gingivitis and early periodontal disease in young adults, as previously noted by AlGhamdi et al. and Baiju et al. [11, 12, 13].

## Conclusion

The results of this study clearly indicate that students of the Faculty of Dentistry have significantly better oral hygiene and gingival health compared to students from other faculties. Lower plaque, calculus,

and gingival index values among dental students reflect a higher level of knowledge, awareness, and correct implementation of oral hygiene habits. In contrast, students from other faculties showed more pronounced signs of gingival inflammation, greater presence of dental plaque and calculus, and less frequent use of additional hygiene aids such as dental floss and interdental brushes.

The findings confirm that education and professional awareness play a key role in forming proper hygiene habits and preventing periodontal disease. These results highlight the need to introduce preventive and educational oral health programs even among non-dental students to increase awareness about the importance of regular hygiene and timely dental check-ups.

Further studies with a larger sample size and additional parameters—such as knowledge level, attitudes, and motivation toward oral health—could contribute to better understanding of how education and behaviors influence the periodontal status of young adults.

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## Declaration of Interest:

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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