

# Knowledge and attitude of dental students in Riyadh City toward the effect of mouthwashes on surface roughness and color stability of some esthetic restorations

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## ABSTRACT

**Objective:** To evaluate the knowledge and attitude of dental students in Riyadh city toward the effect of mouthwash on surface roughness and color stability of some esthetic restorations. **Materials and methods:** This cross-sectional study is directed toward dental students in Riyadh city. The inclusion criteria include both undergraduate students and interns. The exclusion criteria include postgraduate dentist and those in the preparatory year. Also, dental students outside Riyadh are excluded, A questionnaire in English language was distributed through randomized selected participants in both social media (WhatsApp, Twitter) via link in a google sheet. The survey items were divided into two sections that include socio- demographic data and knowledge subscales. **Results:** A total of 455 dental students have filled the survey, among them 168 were excluded because they did not meet the inclusion criteria (they were preparatory year students), making the number of included responses 287. There was a significant difference between males in females when answering the questions related to 1) indication of mouthwash prescription ( $P = 0.044$ ), 2) if mouthwashes increase surface roughness of esthetic restorations ( $P = 0.007$ ) and 3) the type of toothbrush used with esthetic restoration ( $P = 0.016$ ). **conclusion:** there is high awareness and using of mouthwashes among dental students in Riyadh the correlation between mouthwashes and restorative materials needs more spot lightening in the dental education process.

**Keywords:** Color, roughness, esthetic restorations, stability, mouthwash

## Introduction

Direct esthetic restorations have been largely employed to restore anterior teeth due to their low cost and more conservative preparation.<sup>[1]</sup> The continuous improvements in the composition and properties of resin composite have resulted in a wide range

of applications. The main advantages of these restorations are their color matching and surface smoothness. Color stability and surface smoothness are considered by some authors as the key to a pretty smile.<sup>[2]</sup> Since the introduction of composites in 1960, efforts have been made to increase the longevity of composite restorations. Although some progress has been made, optical properties in this type of material need to be improved.<sup>[3]</sup> Composite structure and characteristics of the inorganic fillers have a direct impact on composite resin surface smoothness<sup>[4]</sup> and susceptibility to extrinsic staining.<sup>[5]</sup>

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Maintaining good oral hygiene is the keystone for esthetic restoration success. Mouthwashes are usually used to improve overall oral hygiene. A lot of mouthwashes are present in the market with different ingredients. These ingredients may affect the quality of esthetic restoration negatively.

Besides, one of the principal indications for mouthwashes prescription is the management of gingivitis and elimination of the dental plaque.<sup>[6]</sup> Most of the population may not perform mechanical plaque removal sufficiently. Therefore, antimicrobial mouth rinses that improve daily home care may provide an effective way of removing or controlling bacterial plaque to limit gingivitis and periodontitis.<sup>[7]</sup> Supervised regular use of fluoride mouth rinse by children and adolescents is associated with a large reduction in caries increment in permanent teeth.<sup>[8]</sup>

However, before using mouthwashes, the following factors should be taken into account: person's capability of delivering good oral hygiene (e.g., brushing, flossing), the state of their periodontal health, teeth and oral mucosa as well as the mechanism of mouthwash activity with its potential side effects. Mouthwashes are widely used in addition to teeth brushing and the use of dental floss to decrease the chance of facing any problems that might occur in the oral cavity, such as the development of any diseases as the increased risk of developing gingivitis or periodontitis. Mouth rinses affect oral cavity bacteria that would produce bad odor or breath. Various mouthwashes can contain different substances that would enhance oral hygiene. Studies on chlorhexidine-containing mouthwashes have shown a success rate upon its use on plaque control in dental practice. Chlorhexidine is effective against a wide variety of bacteria, including gram-positive, gram-negative, aerobes, and anaerobes. Its antimicrobial spectrum includes most of the microbial organisms such as gram-positive and gram-negative organisms including bacterial spores, lipophilic viruses, yeasts, and dermatophytes.<sup>[9]</sup>

It has been reported that long-term use of chlorhexidine-containing mouthwashes causes discoloration of tooth restorations.<sup>[10]</sup> Another mouth rinse can contain betadine. Povidone-iodine is a water-soluble combination of molecular iodine and the solubilizing agent polyvinyl pyrrolidone. This iodophor has a bactericidal effect similar to that of pure iodine; is effective against most of the bacteria, including putative periodontal pathogens, fungi, mycobacteria, viruses, and protozoa; fails to initiate sensitivity reactions or allows the development of bacterial resistance; and allows for a slow release of iodine, which ensures the establishment of an optimal, nontoxic concentration at a bactericidal level. Both alcohol-containing mouthwash and alcohol-free mouthwash will affect composite surface hardness. Discoloration of tooth-colored, resin-based materials may be caused by several intrinsic and extrinsic factors.<sup>[11]</sup> Extrinsic factors for discoloration of resin composites include staining by adsorption or absorption of colorants from exogenous sources such as coffee, tea, nicotine, beverages, and mouth rinses.<sup>[12-14]</sup>

Chlorhexidine gluconate is a cationic biguanide with broad-spectrum antimicrobial action and several clinical studies have shown its effectiveness in decreasing the formation of dental biofilm plaque and gingivitis. Alcohol added in mouthwash to function as a solvent for other active substances, preservatives, and antiseptics also harm the soft tissues of the oral cavity, such as an increased risk of ulcers and malignancies in the oral cavity, especially from the alcohol-containing mouthwashes.<sup>[15,16]</sup> The main action of using fluorine is to prevent dental caries by reducing the solubility of the enamel and thereby making it more resistant to an attack of dental caries.<sup>[17]</sup> Other factors that impact the surface roughness of restorative materials is the stiffness of toothbrush bristles, the effect of different toothbrush bristles' stiffness on the surface roughness of restorative materials showed that bristles have an abrasive effect on the composite resin.<sup>[18]</sup>

Dental students today are tomorrow's dentists. It is important to evaluate their knowledge about the available mouthwashes in the Saudi Arabia market and their possible effect on esthetic restorations.

## Methodology

This survey is directed toward dental students in Riyadh city. The inclusion criteria include both undergraduate students and interns. The exclusion criteria include postgraduate dentists and those in the preparatory year whereas dental students outside Riyadh are excluded. A questionnaire in the English language will be distributed through randomized selected participants in both social media (WhatsApp, Twitter) via the link in a google sheet. The survey items will be divided into two sections that include sociodemographic data and knowledge subscales. The knowledge questionnaire will be designed to ask specific questions that are related to knowledge and attitude toward mouthwash effect on surface roughness and color stability of different tooth-colored restorations. Data will be analyzed using statistical package for the social sciences (SPSS) version 21. Participation in the study will be voluntary. Confidentiality of the data will be assured throughout the study. Ethical approval will be obtained from The Research Center Committee of Alfarabi Colleges for Dentistry and Nursing in Riyadh, Saudi Arabia.

## Results

A total of 455 dental students have filled the survey, among them 168 were excluded because they did not meet the inclusion criteria (they were preparatory year students), making the number of included responses 287.

Table 1 displays the demographical data of the participants. 121 (42.2%) of the participants were male and 166 (57.8%) were female. The largest number of participants were from Al Farabi college 87 (30.3%) followed by King Saud bin Abdelaziz University 75 (26.1%). Students from Dar Al Uloom University represented the lowest number of participants 25 (8.7%). The majority of students in this study were interns 115 (40.1%) followed by fifth-year students 84 (29.3%). First-year and

**Table 1: Demographic Profile of The Participants (n=287)**

Demographical Characteristics	n	%
Gender		
Male	121	42.2
Female	166	57.8
College		
Al Farabi college	87	30.3
Riyadh Elm University	29	10.1
King Saud University	38	13.2
King Saud bin Abdelaziz University	75	26.1
Princess Nourah Bint Abdul Rahman University	33	11.5
Dar Al Uloom University	25	8.7
School Year		
First Year	4	1.4
Second Year	4	1.4
Third Year	24	8.4
Fourth Year	56	19.5
Fifth Year	84	29.3
Intern	115	40.1

second-year students were the least to participate with only four participants (1.4%) from each year.

Table 2 demonstrates a comparison based on gender about answering questions regarding knowledge and attitude toward mouthwash prescription. There was a significant difference between males and females in answering the questions related to 1) indication of mouthwash prescription ( $P = 0.044$ ), 2) if mouthwashes increase the surface roughness of esthetic restorations ( $P = 0.007$ ), and 3) the type of toothbrush used with esthetic restoration ( $P = 0.016$ ).

Table 3 shows the differences in answering among students from different colleges. A significant difference in answering between the different colleges was presented in the questions related to 1) the type of mouthwash prescribed for patients with a high risk for caries, 2) the frequency of using mouthwash, 3) if the mouthwashes increase the surface roughness of esthetic restorations, 4) if mouthwash affects the color of restorations, 5) if they would prescribe chlorhexidine containing mouthwash to a patient with esthetic restoration, and 6) the type of toothbrush used with esthetic restoration ( $P = 0.002$ ,  $P = <0.001$ ,  $P = 0.012$ ,  $P = <0.001$ ,  $P = 0.038$ ,  $P = <0.001$ , respectively).

A demonstration of the differences in answering based on the academic year was shown in Table 4. There was a significant difference between students from different academic years in answering the question related to 1) indication of mouthwash prescription ( $P = 0.005$ ), 2) the frequency of using mouthwash ( $P = 0.027$ ), 3) if the mouthwashes increase the surface roughness of esthetic restorations ( $P = 0.011$ ), and 4) which material has a higher discoloration rate ( $P = 0.025$ ).

## Discussion

In our study, 70.39% of the participants choose either gingivitis or periodontitis as the main indication for prescribing mouthwashes to the patients, which matches with the indication for prescribing mouth rinses by Kocak, (2009), however, 61.32% of the participants think that prescribing a fluoridated mouthwash is the best choice for managing patients with high-risk caries coincides with the results found by Marinho (2016). These findings emphasize that the education of mouthwashes and their application and prescription criteria among the undergraduate dental students in Riyadh city, the Kingdom of Saudi Arabia is of good quality and the dental schools provide the dental student with a good attitude regarding mouthwashes prescription.

More than 60% of the participants are using mouthwash daily, which indicates a high awareness of personal oral hygiene among undergraduate dental students in Riyadh city. On the other hand, 51.91% do not know if mouthwashes can affect the surface roughness of esthetic restorations, and 20.21% answered that there is no effect, thus, showing that only 27.88% know that it can affect the surface roughness of esthetic restorations. This could be because of the inadequate information that has been taught in bachelor dental schools regarding the effect of mouthwash on the surface roughness of esthetic restorations.

When asking participants about their viewpoint on prescribing chlorhexidine to patients with esthetic restorations, nearly 50.87% answered with a confirmation showing a conflict in both prescribing chlorhexidine types of mouthwash and its effect on esthetic restorations. While asking whether a mouth wash contains betadine, 59.24% of participants answered no regarding prescribing betadine containing mouthwash with patients having esthetic restorations.

Regarding alcohol, 54.35% answered with “no” to prescribing alcohol-containing mouthwashes with patients having esthetic restorations.

A total of 156 out of 287 participants did not prescribe alcohol mouthwash to patients with esthetic restorations and they agree with Munawar (2003) that alcohol-containing mouthwash was decreasing the surface hardness hybrid restorative material. Besides, Listerine contains alcohol it has a greater influence on the sorption rate of the composite restoration, especially on the hybrid and nanohybrid (Haq, Batool, *et al.* 2009).

About 51% of the participants in our study would like to prescribe chlorhexidine gluconate mouthwash with the patient having esthetic restoration, chlorhexidine mouthwash causes discoloration when used daily and ceramic restorations will change color when they are exposed to chlorhexidine mouthwashes (Kristen and Friedrich 2004). Therefore, undergraduate students in Riyadh city should be more concerned when they prescribe a chlorhexidine mouthwash.

**Table 2: Gender-Based Comparison of Answers (n=287)**

Question	Male		Female		P
	n	%	n	%	
Q1/What is your main cause to prescribe a mouthwash to the patient?					
Halitosis	16	5.57	25	8.71	0.044*
Gingivitis	23	8.01	54	18.82	
Periodontitis	59	20.56	66	23.00	
High caries risk	23	8.01	21	7.32	
Q2/Patient comes to your clinic suffering from high risk caries, you are going to prescribe a mouthwash, what is its type?					
Chlorhexidine containing	33	11.50	47	16.38	0.052
Betadine containing	8	2.79	3	1.05	
Alcohol containing	12	4.18	8	2.79	
Fluoride containing	68	23.69	108	37.63	
Q3/What is your frequency of using mouthwash?					
1 time daily	26	9.06	45	15.68	0.221
2 times daily	38	13.24	50	17.42	
3 times daily	12	4.18	7	2.44	
I am not using	45	15.68	64	22.30	
Q4/Does the mouthwashes increase the surface roughness of esthetic restorations?					
Yes	43	14.98	37	12.89	0.007*
No	28	9.76	30	10.45	
I do not know	50	17.42	99	34.49	
Q5/Does the mouthwash affects the color of restorations?					
Yes	58	20.21	95	33.10	0.079
No	28	9.76	22	7.67	
I do not know	35	12.20	49	17.07	
Q6/Which of the following materials will have a higher discoloration rate?					
GIC	71	24.74	84	29.27	0.397
Composite	38	13.24	63	21.95	
Ceramic	12	4.18	19	6.62	
Q7/Which of the following materials will have a higher surface roughness?					
GIC	55	19.16	95	33.10	0.132
Composite	44	15.33	45	15.68	
Ceramic	22	7.67	26	9.06	
Q8/Would you prescribe chlorhexidine containing mouthwash to a patient with esthetic restoration?					
Yes	67	23.34	79	27.53	0.193
No	54	18.82	87	30.31	
Q9/Would you prescribe betadine containing mouthwash to a patient with esthetic restoration?					
Yes	56	19.51	61	21.25	0.105
No	65	22.65	105	36.59	
Q10/Would you prescribe an alcohol-containing mouthwash to a patient with esthetic restoration?					
Yes	60	20.91	71	24.74	0.252
No	61	21.25	95	33.10	
Q11/Would you prescribe a fluoride-containing mouthwash to a patient with esthetic restoration?					
Yes	92	32.06	137	47.74	0.176
No	29	10.10	29	10.10	
Q12/Do you think a toothbrush has an effect on the restoration?					
Yes	76	26.48	91	31.71	0.175
No	45	15.68	75	26.13	
Q13/What is the type of toothbrush used with esthetic restoration?					
Soft	78	27.18	127	44.25	0.016*
Medium	29	10.10	33	11.50	
Hard	14	4.88	6	2.09	

When asking participants upon the prescribing fluoride-containing mouthwash to patients with esthetic restorations 79.8% answered with yes which shows a value in controlling the caries progression

in the teeth but can also induce a color change in tooth color restorations with prolonged usage. More than 80% of the participants prefer using a soft toothbrush with good esthetic

**Table 3: College Based Comparison of Answers (n=287)**

Question	Al Farabi College		Riyadh Elm University		King Saud University		King Saud bin Abdulaziz University		Princess Nourah Bint Abdul Rahman University		Dar Al Uloom University		P
	n	%	n	%	n	%	n	%	n	%	n	%	
	Q1/What is your main cause to prescribe a mouthwash to the patient?												
Halitosis	15	5.23	4	1.39	8	2.79	8	2.79	4	1.39	2	0.70	0.276
Gingivitis	26	9.06	5	1.74	13	4.53	20	6.97	5	1.74	8	2.79	
Periodontitis	31	10.80	17	5.92	13	4.53	39	13.59	16	5.57	9	3.14	
High caries risk	15	5.23	3	1.05	4	1.39	8	2.79	8	2.79	6	2.09	
Q2/Patient comes to your clinic suffering from high-risk caries, you going to prescribe a mouthwash, what type is it going to be?													
Chlorhexidine containing	33	11.50	8	2.79	7	2.44	11	3.83	13	4.53	8	2.79	0.002*
Betadine containing	1	0.35	0	0.00	1	0.35	2	0.70	4	1.39	3	1.05	
Alcohol containing	5	1.74	2	0.70	2	0.70	6	2.09	1	0.35	4	1.39	
Fluoride containing	48	16.72	19	6.62	28	9.76	56	19.51	15	5.23	10	3.48	
Q3/What is your frequency of using mouthwash?													
1 time daily	27	9.41	10	3.48	10	3.48	16	5.57	4	1.39	4	1.39	<0.001*
2 times daily	39	13.59	8	2.79	10	3.48	24	8.36	5	1.74	2	0.70	
3 times daily	2	0.70	0	0.00	4	1.39	3	1.05	4	1.39	6	2.09	
I'm not using	19	6.62	11	3.83	14	4.88	32	11.15	20	6.97	13	4.53	
Q4/Does the mouthwashes increase the surface roughness of esthetic restorations?													
Yes	32	11.15	13	4.53	10	3.48	16	5.57	6	2.09	3	1.05	0.012*
No	22	7.67	5	1.74	4	1.39	13	4.53	6	2.09	8	2.79	
I do not know	33	11.50	11	3.83	24	8.36	46	16.03	21	7.32	14	4.88	
Q5/Does the mouthwash affects the color of restorations?													
Yes	51	17.77	26	9.06	14	4.88	46	16.03	11	3.83	5	1.74	<0.001*
No	21	7.32	2	0.70	8	2.79	6	2.09	7	2.44	6	2.09	
I do not know	15	5.23	1	0.35	16	5.57	23	8.01	15	5.23	14	4.88	
Q6/Which of the following materials will have a higher discoloration rate?													
GIC	51	17.77	17	5.92	22	7.67	40	13.94	15	5.23	10	3.48	0.683
Composite	28	9.76	11	3.83	10	3.48	26	9.06	14	4.88	12	4.18	
Ceramic	8	2.79	1	0.35	6	2.09	9	3.14	4	1.39	3	1.05	
Q7/Which of the following materials will have a higher surface roughness?													
GIC	46	16.03	18	6.27	20	6.97	42	14.63	15	5.23	9	3.14	0.077
Composite	32	11.15	8	2.79	9	3.14	19	6.62	8	2.79	13	4.53	
Ceramic	9	3.14	3	1.05	9	3.14	14	4.88	10	3.48	3	1.05	
Q8/Would you prescribe a chlorhexidine-containing mouthwash to a patient with esthetic restoration?													
Yes	42	14.63	20	6.97	23	8.01	28	9.76	19	6.62	14	4.88	0.038*
No	45	15.68	9	3.14	15	5.23	47	16.38	14	4.88	11	3.83	
Q9/Would you prescribe a betadine-containing mouthwash to a patient with esthetic restoration?													
Yes	34	11.85	10	3.48	16	5.57	33	11.50	14	4.88	10	3.48	0.965
No	53	18.47	19	6.62	22	7.67	42	14.63	19	6.62	15	5.23	
Q10/Would you prescribe an alcohol-containing mouthwash to a patient with esthetic restoration?													
Yes	28	9.76	14	4.88	18	6.27	41	14.29	17	5.92	13	4.53	0.081
No	59	20.56	15	5.23	20	6.97	34	11.85	16	5.57	12	4.18	
Q11/Would you prescribe a fluoride-containing mouthwash to a patient with esthetic restoration?													
Yes	74	25.78	23	8.01	30	10.45	60	20.91	26	9.06	16	5.57	0.368
No	13	4.53	6	2.09	8	2.79	15	5.23	7	2.44	9	3.14	

Contd...



**Table 3: Contd...**

Question	Al Farabi College		Riyadh Elm University		King Saud University		King Saud bin Abdulaziz University		Princess Nourah Bint Abdul Rahman University		Dar Al Uloom University		P
	n	%	n	%	n	%	n	%	n	%	n	%	
	Q12/Do you think a toothbrush affects the restoration?												
Yes	53	18.47	21	7.32	23	8.01	37	12.89	20	6.97	13	4.53	0.341
No	34	11.85	8	2.79	15	5.23	38	13.24	13	4.53	12	4.18	
Q13/What is the type of toothbrush used with esthetic restoration?													
Soft	74	25.78	23	8.01	28	9.76	52	18.12	19	6.62	9	3.14	<0.001*
Medium	7	2.44	6	2.09	9	3.14	17	5.92	12	4.18	11	3.83	
Hard	6	2.09	0	0.00	1	0.35	6	2.09	2	0.70	5	1.74	

\*Significant at level 0.05

**Table 4: Academic Year Based Comparison of Answers (n=287)**

Question	Year 1		Year 2		Year 3		Year 4		Year 5		Intern		P
	n	%	n	%	n	%	n	%	n	%	n	%	
	Q1/What is your main cause to prescribe a mouthwash to the patient?												
Halitosis	2	0.70	1	0.35	2	0.70	8	2.79	11	3.83	17	5.92	0.005*
Gingivitis	0	0.00	1	0.35	12	4.18	20	6.97	23	8.01	21	7.32	
Periodontitis	0	0.00	1	0.35	4	1.39	26	9.06	36	12.54	58	20.21	
High caries risk	2	0.70	1	0.35	6	2.09	2	0.70	14	4.88	19	6.62	
Q2/Patient comes to your clinic suffering from high-risk caries, you going to prescribe a mouthwash, what type is it going to be?													
Chlorhexidine containing	1	0.35	1	0.35	3	1.05	13	4.53	31	10.80	31	10.80	0.598
Betadine containing	0	0.00	0	0.00	1	0.35	2	0.70	4	1.39	4	1.39	
Alcohol containing	0	0.00	1	0.35	3	1.05	2	0.70	7	2.44	7	2.44	
Fluoride containing	3	1.05	2	0.70	17	5.92	39	13.59	42	14.63	73	25.44	
Q3/What is your frequency of using mouthwash?													
1 time daily	2	0.70	1	0.35	1	0.35	16	5.57	14	4.88	37	12.89	0.027*
2 times daily	1	0.35	2	0.70	10	3.48	10	3.48	30	10.45	35	12.20	
3 times daily	1	0.35	0	0.00	2	0.70	1	0.35	8	2.79	7	2.44	
I am not using	0	0.00	1	0.35	11	3.83	29	10.10	32	11.15	36	12.54	
Q4/Does the mouthwashes increase the surface roughness of esthetic restorations?													
Yes	2	0.70	1	0.35	4	1.39	9	3.14	30	10.45	34	11.85	0.011*
No	1	0.35	0	0.00	2	0.70	8	2.79	15	5.23	32	11.15	
I do not know	1	0.35	3	1.05	18	6.27	39	13.59	39	13.59	49	17.07	
Q5/Does the mouthwash affects the color of restorations?													
Yes	2	0.70	2	0.70	8	2.79	27	9.41	45	15.68	69	24.04	0.092
No	1	0.35	1	0.35	6	2.09	4	1.39	17	5.92	21	7.32	
I do not know	1	0.35	1	0.35	10	3.48	25	8.71	22	7.67	25	8.71	
Q6/Which of the following materials will have a higher discoloration rate?													
GIC	2	0.70	1	0.35	8	2.79	30	10.45	47	16.38	67	23.34	0.025*
Composite	0	0.00	3	1.05	10	3.48	22	7.67	26	9.06	40	13.94	
Ceramic	2	0.70	0	0.00	6	2.09	4	1.39	11	3.83	8	2.79	
Q7/Which of the following materials will have a higher surface roughness?													
GIC	2	0.70	1	0.35	7	2.44	30	10.45	46	16.03	64	22.30	0.305
Composite	1	0.35	3	1.05	12	4.18	16	5.57	27	9.41	30	10.45	
Ceramic	1	0.35	0	0.00	5	1.74	10	3.48	11	3.83	21	7.32	
Q8/Would you prescribe chlorhexidine containing mouthwash to a patient with esthetic restoration?													
Yes	3	1.05	2	0.70	10	3.48	27	9.41	45	15.68	59	20.56	0.827
No	1	0.35	2	0.70	14	4.88	29	10.10	39	13.59	56	19.51	

Contd...

**Table 4: Contd...**

Question	Year 1		Year 2		Year 3		Year 4		Year 5		Intern		P
	n	%	n	%	n	%	n	%	n	%	n	%	
Q9/Would you prescribe betadine containing mouthwash to a patient with esthetic restoration?													
Yes	1	0.35	3	1.05	8	2.79	24	8.36	35	12.20	46	16.03	0.691
No	3	1.05	1	0.35	16	5.57	32	11.15	49	17.07	69	24.04	
Q10/Would you prescribe an alcohol-containing mouthwash to a patient with esthetic restoration?													
Yes	3	1.05	3	1.05	9	3.14	30	10.45	42	14.63	44	15.33	0.156
No	1	0.35	1	0.35	15	5.23	26	9.06	42	14.63	71	24.74	
Q11/Would you prescribe a fluoride-containing mouthwash to a patient with esthetic restoration?													
Yes	3	1.05	3	1.05	23	8.01	42	14.63	65	22.65	93	32.40	0.401
No	1	0.35	1	0.35	1	0.35	14	4.88	19	6.62	22	7.67	
Q12/Do you think a toothbrush affects the restoration?													
Yes	4	1.39	2	0.70	13	4.53	28	9.76	46	16.03	74	25.78	0.229
No	0	0.00	2	0.70	11	3.83	28	9.76	38	13.24	41	14.29	
Q13/What is the type of toothbrush used with esthetic restoration?													
Soft	3	1.05	2	0.70	17	5.92	41	14.29	59	20.56	83	28.92	0.842
Medium	1	0.35	2	0.70	7	2.44	10	3.48	19	6.62	23	8.01	
Hard	0	0.00	0	0.00	0	0.00	5	1.74	6	2.09	9	3.14	

\* Significant at level 0.05

restoration even though according to Zairani study says that after 5 min of brushing in both soft- and medium-bristle groups, no So the study has stated that multiple factors of brushing can influence surface roughness. These factors include brushing technique, load during brushing, duration and frequency of brushing, and type and stiffness of bristles. The stiffer the bristles, the more they will abrade the restoration surface.<sup>[18]</sup>

### Conclusion

- Indications of mouthwashes is a topic well-taught in Riyadh
- High awareness and use of mouthwashes among dental students in Riyadh
- The correlation between mouthwashes and restorative materials needs more spot lightening in the dental education process.

### Clinical Statement

The importance of this research lies in determining the extent to which dental students in Riyadh city acknowledge the effect of mouthwashes on the colors of esthetic restorations and the roughness of their surface. Accordingly, recommendations are made to update curricula or methods of teaching, which is positively reflected on the longevity of these restorations in society and the preservation of oral health.

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### Conflicts of interest

There are no conflicts of interest.

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