



A Comparative Assessment of the Quality of Communication and Interactions between Dental Students and Dental Technicians for Fixed Prosthesis in Saudi Arabia

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Authors' contributions

This work was carried out in collaboration among all authors. Author KS conceptualized the study, formulated the study design with regard to this work and was also the principal investigator and primary author of the manuscript. He also analyzed the collected data and coordinated with the statistician for the analysis of the data. Authors RMM, FAA, SNA and LSA gathered the data, helped in analysis of these data and necessary inputs were given towards the designing of manuscript. All authors discussed the methodology and results and contributed to the final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Improving communication and collaboration between members of the dental team is important to the long term aim of improving the quality of dental care for patients. The aim of this cross-sectional study was to compare and assess the communication and interactions between dental students and laboratory technicians for fixed prosthesis.

Materials and Methods: The Survey based study was conducted online using a self-structured, pre-tested, closed ended with Face validity and content validity and consisting of 18 questions for dental students and 18 questions for dental technicians. Questionnaire was designed to compare

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and assess the quality of communication between dental students and laboratory technicians for fixed prosthodontics in Makkah region of Saudi Arabia. The data were tabulated and analyzed using SPSS version 21. Chi-square test was used to compare and assess the quality of communication between dental students and laboratory technicians for fixed prosthodontics. P-value of less than 0.05 was considered statistically significant.

Results: In our survey around forty percent of technicians indicated that work authorization forms were complete and legible to provide the prosthesis. Regarding Communication with the dental technicians by the dental students, 38.5% (77) of them communicate by filling the authorization form, 38.5% (77) of them giving instructions to the delivery boy and 21% (42) of them giving instructions over the phone.

Conclusion: Communication between dentist and dental students are very important and it is recommended to fill the authorization form for fixed prosthesis. Technicians should undergo training with designing of fixed prosthesis especially pontic design.

Keywords: Prosthodontics; dental technicians; dental study; comparative assessment; fixed prosthesis.

1. INTRODUCTION

Fixed prosthodontics plays an important role for the patient who lost one or more teeth. In present era of high esthetic demands from the patient are aware of development with technology as well as biomaterials. It is necessary to provide prosthesis with adequate masticatory, phonetic, and esthetic function. For the successful treatment of fixed dental prosthesis, all the procedures should be completed with utmost watchful and accurate methods. [1,2]. Quality of dental Prosthesis depends upon various factors such as related to the dentist, the laboratory technician or both [3]. Dentist and laboratory technicians should have effective and crystal clear communication so that the patient gets quality treatment. [4-8]. Insufficient communication between dentist and laboratory technicians has been considered to be a major factor in failure to provide the patient with successful dental treatment for the patient. [9,10].

Guiding principles issued by the American dental association to improve the relationship between the dentist and dental technicians were as follows: Clear effective communication of design features between dental practitioners and dental technicians that leads to the high quality fixed and removable prostheses. Inadequate design information to the technician results in a prosthesis that is constructed which might cause tissue damage [11-13].

The work relationship between the dental students and dental technicians has to be based on communication by work authorization paper.

Most of the time both make assumptions based on their own knowledge and experience. This unreliable means of communication results wrong design of the prosthesis and which in turn compromising with the quality and many times patient may not accept the outcome of the treatment [14-16].

The responsibility of the technician is to fabricate a prosthesis in compliance with the specific instructions given by the dentist. Many times dentists try to take shortcuts and skips some important clinical steps due to time constraint. In an attempt to please the dentist, the laboratory technicians forced to accept to oblige. It is the responsibility of both dentists and dental technicians to communicate with each other, so that error in the fabrication of prosthesis will be minimized [13]. There are only few studies are available regarding communication between dental students and dental technicians pertaining to the particular region of Saudi Arabia and most of the researchers have focused on a particular region and did not undergo a nation-wide study. Hana M. Al-AL Sheikh's [17] study was restricted to Riyadh and Amjad et al. [18] study to Al-Qassim. Hence, this cross-sectional study was proposed to compare and assess the communication and interactions between dental students and laboratory technicians for fixed prosthesis in Makkah region of Saudi Arabia.

2. MATERIALS AND METHODS

This study was conducted in the dentistry program of Ibn Sina National College for Medical studies, Jeddah and approved

by the institutional ethical committee and approval number is H-10-13082020. A cross-sectional, questionnaire based study was conducted among the dental students and interns covering various dental colleges and dental technicians in Makkah region, Saudi Arabia.

The non-probability convenience sampling technique was used and the sample size was selected based on the formula. $(Z_{1-\alpha/2} P(1-P) d^2)$ (20), where $Z_{1-\alpha/2}$ = standard normal variate (at 5% type 1 error ($P < 0.05$), it is 1.96 and at 1% type 1 error ($p < 0.01$) $P =$ expected proportion in population based on previous studies or pilot studies $d =$ absolute error or precision.

Inclusion criteria: All the dental students and dental technicians dealing with fixed prosthesis who were willing to participate in the study. Exclusion criteria: Dental students and dental technicians who are not willing to participate in this study. The Survey based study was conducted online using a self-structured, pre-tested, closed ended with Face validity and content validity and consisting of 18 questions for dental students and 18 questions for dental technicians. Questionnaire was designed to compare and assess the quality of communication between dental students and laboratory technicians for fixed prosthodontics. Inclusion criteria: All the dental students and dental technicians who were dealing with fixed prosthesis and willing to participate in this study. Exclusion criteria: Dental students and dental technicians who were not willing to participate in this study.

Target group for this study was fifth year, sixth year and interns of dental universities and dental technicians around Makkah region of Saudi Arabia. Consent of the participants was incorporated into the on-line survey form in such a manner that once the participant approves and could proceed to take the survey. The study population was selected using convenience sampling. This questionnaire was sent online to 300 dental students and 150 dental technicians who were randomly selected and the purpose of the study was explained to them; out of which 200 dental students and 100 dental technicians responded. Their names were not recorded in the data entry to ensure anonymity. The study was completed in 2 months. Link for the

questionnaire for the dental students and dental technicians:

https://docs.google.com/forms/d/e/1FAIpQLSfDUMxQPhZAgSWdgsCvJ9E1CiOxWrkdd_z0t-mgXqMpdLgVhA/viewform?vc=0&c=0&w=1&flr=0.

<https://docs.google.com/forms/d/e/1FAIpQLSfQhOASnSoU288hv1jlsPWATU1vGByAP-tj6naboaDFCByeQ/viewform?vc=0&c=0&w=1&flr=0>.

3. RESULTS

In our survey around forty percent of technicians indicated that work authorization forms were complete and legible to provide the prosthesis. Regarding Communication with the dental technicians by the dental students, 38.5% (77) of them communicate by filling the authorization form, 38.5% (77) of them giving instructions to the delivery boy and 21% (42) of them giving instructions over the phone. 2% (4) of them don't give any instructions. Among the dental technicians, 43.7% (45) of them told that dental students communicate with them by filling the laboratory authorization form and 24.2% (25) of them responded saying dental students giving instructions to the delivery boy. And 20.4% (21) of them felt told that dental students giving instructions over the phone and 11.7% (12) of them don't give any instructions.

38.5% (77) of them communicate by filling the authorization form, 38.5% (77) of them giving instructions to the delivery boy and 21% (42) of them giving instructions over the phone. 2% (4) of them don't give any instructions. Among the dental technicians, 43.7% (45) of them told that dental students communicate with them by filling the laboratory authorization form and 24.2% (25) of them responded saying dental students giving instructions to the delivery boy. And 20.4% (21) of them felt told that dental students giving instructions over the phone and 11.7% of them don't give any instructions. Chi-square test shows statistical significant association between question number-1 (How do you communicate?) and dental students and dental technicians. Chi-square value is 19.67 and level of significance is 0.000. Laboratory authorization form 65.5% (131) of the dental students fill the authorization forms for fixed prosthesis, 34.5% (69) of them would not fill the authorization forms. Among the

dental technicians, 64.1% (66) of them expect dental students to fill the authorization form and 35.9% (37) of them would not. Disinfecting: 89.5% (179) of the dental students believe in disinfecting the impressions before sending it to the laboratory and 10.5% (21) of them would not. 54.4% (56) of the dental technicians felt that dental students disinfect the impressions before sending it to the laboratory and 45.6% (47) of them felt other way. 75.5% (151) of the dental students satisfied with the laboratory work provided by the dental technicians whereas 24.5 (49) of them were not. Chi-square test does not shows statistical significant association between question-2 (filling laboratory authorization form for fixed partial dentures) and dental students and dental technicians. Chi-square value is 0.014 and level of significance is 0.9. Chi-square test does not shows statistical significant association between question-3 (disinfecting the impression) and dental students and dental technicians. Chi-square value is 46.21 and level of significance is 0.000. For question number-4 (completing the work related to fixed partial dentures) chi-square test shows significant association between dental students and dental technicians. Chi-square value is 0.002 and level of significance is 0.96. For question number-5 (delay with the work) chi-square test shows significant association between dental students and dental technicians. Chi-square value is 17.07 and level of significance is 0.00

Table 1.

63.1% of the dental technicians told that dental students were satisfied with the laboratory work provided by them and 36.9% (38) of them responded other way. 34% (68) of the dental students felt that laboratory technicians always follows ridge lap pontic, 27% (54) of them felt that in spite of giving the instructions repeatedly, pontic is designed according to his convenience. 46.7% (48) of the dental technicians told that dental students feel that most of the dental technicians always follow ridge lap pontic and 22.6% (23) of them responded saying that dental students felt that in spite of giving the instructions repeatedly, pontic is designed according to his convenience. 67% (134) of them felt that there was always miscommunication between dental technicians and dental students and 33% (66) of them felt other way. 68% (70) of the dental technicians told that there was always miscommunication between dental students and dental technicians whereas 34%

(35) of them felt other way. 70.5% (141) of the dental students felt that quality of the work provided by the technician was not good as that provided for the private practitioners and 29.5% (59) of them felt other way. Chi-square test does not shows statistical significant association between question number-9 (Instructions followed while fabricating fixed partial dentures) and dental students and dental technicians. Chi-square value is 0.002 and level of significance is 0.96. For question number-10 (Common mistakes while fabricating fixed partial dentures) chi-square test shows significant association between dental students and dental technicians. Chi-square value is 8.63 and level of significance is 0.03

Table 2.

For question number 13 and 14 (Miscommunication between dental students and dental technicians) and (Colleagues also face miscommunication issues) chi-square test does not shows significant association between dental students and dental technicians. Chi-square value is 0.002 and level of significance is 0.96. For question number 14 and 15 (Colleagues also face miscommunication issues) (Overcome miscommunication problems) and chi-square test does not shows significant association between dental students and dental technicians. Chi-square value is 2.29 and level of significance is 0.13. For question number 15 and 16 (Overcome miscommunication problems) and (Under pressure if the work is delayed) and chi-square test does not shows significant association between dental students and dental technicians. Chi-square value is 5.89 and level of significance is 0.11

Table 3.

4. DISCUSSION

The usual communication between dentist and dental technicians through a laboratory work authorization Form regarding the design of fixed prosthesis. Major challenges faced by the clinicians and technicians is the miscommunication. [19,20]. The present research study was directed in a way to investigate the quality of communication between dentists and dental laboratory technicians from the perspective of a dental laboratory technician and to understand their beliefs on communication in the dental environment.

Table 1. Chi-square value is 17.07 and level of significance is 0.00

Questions	Responses	Dental students		Technicians		Chi-square value	p value
		Frequency	Percent	Frequency	Percent		
Q1	Don't give any instructions and leave it to the technician.	4	2	12	11.7	19.67	0.00*
	Filling laboratory authorization form.	77	38.5	45	43.7		
	Giving instructions over the phone.	42	21	25	24.2		
	Giving instructions to the delivery boy.	77	38.5	21	20.4		
Q2	No.	69	34.5	37	35.9	0.014	0.9
	Yes.	131	65.5	66	64.1		
Q3	No	21	10.5	47	45.6	46.21	0.00*
	Yes	179	89.5	56	54.4		
Q4	No.	69	34.5	36	35	0.002	0.96
	Yes.	131	65.5	67	65		
Q5	Yes	108	54	29	28.2	17.07	0.00*
	Occasionally	66	33	55	54.4		
	Regularly	26	13	19	17.4		

Table 2. Chi-square value is 8.63 and level of significance is 0.03

Questions	Responses	Dental students		Technicians		Chi-square value	p value
		Frequency	Percent	Frequency	Percent		
Q6	No.	6	3	19	18.4	19.43	0.00*
	Yes.	194	97	84	81.6		
Q9	No.	66	33	35	34	0.002	0.96
	Yes.	134	67	68	66		
Q10	Dental technician always follows ridge lap pontic.	68	34	48	46.7	8.63	0.03*
	Does not follow instructions provided in the laboratory authorization form.	50	25	28	27.3		
	In spite of giving the instructions repeatedly pontic is designed according to his convenience.	54	27	23	22.6		
	Most of the technicians do not know about modified ridge lap pontic.	28	14	4	3.5		

Table 3. chi-square value is 5.89 and level of significance is 0.11

QUESTION	Responses	Dental students		Technicians		Chi-square value	p value
		Frequency	Percent	Frequency	Percent		
Q13(D)and Q14 (T)	No.	66	33	33	32	0.002	0.96
	Yes.	134	67	70	68		
Q14(D) and Q15 (T)	No.	50	25	35	34	2.29	0.13
	Yes.	150	75	68	66		
Q15(D) and Q16 (T)	Follow the instructions provided by the student.	44	22	17	16.5	5.89	0.11*
	Giving enough time to complete the work.	20	10	20	19.5		
	Providing all the details required.	66	33	38	36.9		
	Utilizing the laboratory authorization form.	70	35	28	27.2		

**significant*

Regarding Communication with the dental technicians by the dental students, 38.5% (77) of them communicate by filling the authorization form. Among the dental technicians, 43.7% (45) of them told that dental students communicate with them by filling the laboratory authorization form. Rest of them communicated verbally. Laboratory authorization form 65.5% (131) of the dental students fill the authorization forms for fixed prosthesis. According to some previous surveys, technicians were dissatisfied with the insufficient and unclear information provided on the work authorization Form. Afshar zand et al. [7] stated that "laboratory work authorization Forms have been called the most frequently used and abused form of communication between the dentist and the laboratory". Only 26% of the surveyed laboratories indicated that their work authorizations were complete enough to perform their best service, while 46% reported that they received only the minimum information to complete the task [21].

Disinfecting: 89.5% (179) of the dental students believe in disinfecting the impressions before sending it to the laboratory. 54.4% (56) of the dental technicians felt that dental students disinfect the impressions before sending it to the laboratory. A survey reported IN United Kingdom, stated that the majority (94.9%) of dentists always disinfected the impressions, 3.8% sometimes, and 1.3% never disinfected impressions [22]. In contrast, a study conducted in Saudi Arabia revealed that 60.87% of dental technicians knew that the impressions received from dental clinics were disinfected, and 56.25% of the dentists informed their laboratory technicians about the disinfection status [23,24]. Study by Alammari et al. [25] who found 9.75% of written cases reporting disinfection of the master impression. These results conflicted with 81% of dental laboratory technicians reporting clear disinfection of the master impression in the clinical study performed by Al-AL Sheikh [17].

Various studies showed that a lack of concise communication between the dentists and dental laboratory Alammari et al. [25]. In their cross-sectional study reported 55% of written instructions for dental cases as poor whereas written instructions were described as 'clear' in 31% of cases in the study by Kilfeather et al [26]. 36.5% of data was considered satisfactory and clear whilst 22.8% of cases were viewed as unsatisfactory and poor. The cross-sectional study by Al-AL Sheikh [17] indicated that 50% of

written instructions were clear and understandable.

In the study by Dawson et al. [27], 46.9% of dental laboratory technician's occasionally interact with the patient whilst 28.1% rarely do and they suggested that engaging and exposing the dental technician more to the clinical environment may yield better results with regards to decision making in treatment plans and restorative practices.

According to Stewart [28], it is important that dentists recognize their ethical and legal responsibilities. Dentists have the knowledge and authority to delegate laboratory procedures based on patients' functional and aesthetical demands. Therefore, it is the responsibility of the dentist to design the final prosthesis without seeking assistance from the technician. The responsibility of the technician is to fabricate the prosthesis as prescribed on the work authorization form.

In 2009, Christensen suggested the following to improve dentist-technician integration and communication: 1. Attending continuing education courses together. 2. Holding private meetings. 3. Increasing the quality and scope of communication in laboratory orders. 4. Making postoperative telephone calls to technicians. 5. Incorporating technicians into dental practices or buildings. 6. Joining study clubs or dental organizations that include both dentists and technicians. 7. Promoting integrated education of dental and laboratory technology students.

5. LIMITATIONS OF THE STUDY

The present study had few limitations.

1. Limited sample size. For this study sample size was 200 dental students and 100 dental technicians. It is recommended to do further study with more sample size.
2. Present study was restricted to fixed prosthesis and further study is required to view the communication between dental students and dental technicians with all the branches of prosthodontics.

6. CONCLUSION

Within the limitations of the study following conclusions were drawn:

1. Communication between dentist and dental students are very important and it is

- recommended to fill the authorization form for fixed prosthesis.
2. Dental students should be trained to disinfect the impression before sending it to the laboratory.
 3. Technicians should undergo training with designing of fixed prosthesis especially pontic design .
 4. Technicians should not accept the work without filled laboratory authorization form.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

This study was conducted in the dentistry program of Ibn Sina National College for Medical studies, Jeddah and approved by the institutional ethical committee and approval number is H-10-13082020.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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