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Evaluation of Communication Between Dental Laboratories and Dentists for Fixed Prosthodontics

Ali Saleh Mohammed Alkhamsan[1], Yahyaahmed al mustanyir[2], Ali Saeed Ali Alyami[3], Mohammed Shaghath HadiAlsaqoor[3], Abdullah omaryousef[4], Abdulghani Saeed Al Zahrani[5], Hamad Mohammad Saleh Alyami[3], Mohammad Mani Hussain Alsagoor[3], Yahia Salem Ali Alnaseib[6], Amersalem Hamad Al sulaiman[7], Mohammed Hussain Bin Salem AlQirad[8]

1. Dental Hygienist, Najran Health Cluster
2. Dentist, Najran health cluster
3. Dental Lab technician, Najran health Cluster
4. Consultant in restorative dentistry, Department of restorative dentistry, Ohud hospital health ministry Al Madinah Al Monaurah
5. Senior-registrar in Restorative, Dentistry, Al Naeriyah General Hospital, Eastren Cluster. KSA
6. Dental technician, Arab community college, Ministry of health
7. Dental Assistant, Al Kharaa Health Center, Najran
8. Dental Technology, Al-Qunfudhah General Hospital

ABSTRACT

Objective. This study aimed to estimate the communication between dental practitioners and dental technicians, through fixed prosthodonticsfrom a dental laboratory technician's point of view, study the weak points, and try to offer them. Methods. In Tripoli, a randomized sample ofprivate dental laboratories was chosen. A hundred and fifty questionnaires were distributed, and 130 were received (response ratF87%). A part of the questionnaires was mailed to the laboratory directors ofdental laboratories and others were distributed to the dental technicians personally (face to face). The survey asked questions about the following areas of work authorization: Academic certificate, Years of work as a dental clinician, choice of materials for the prosthesis, design of thefixed prosthesis, and shade description. The use of impression materials forfixed prosthodontics was part of the questionnaire. For each question, the number of responses received was tabulated and converted to a percentage. Data were collected and analyzed statistically with (SPSS) version 25 software and Pearson's Chi-square test p value < 0.05 was considered as statistically significant. Results. The findings showed that the telephone 42.9% and written dental prescription 24.2% are the main communication tools. The technician is more likely to choose fixed prosthesis design alone when conversing with doctors verbally or via email, while they sometimes choose it when sending them written prescriptions. Therefore, the best form of cooperation would be a written prescription. 84.6% of dental technicians received impressions in a nondisinfected state. The plastic stock tray was the most common choice of impression tray (75.4%). The minority of dental

technicians 19.7% are discussing pontics design with the dentist. Conclusion. According to Tripoli dental technicians, good quality communication between both dental technologists and dentists is not always present. The connection between these two dental offices still needs work.

Keywords: Dental Communication, Technicians, Fixed Prostheses, Dentists.

1. Introduction

The extent of harmony between the clinician and technician is reversed to patient satisfaction with the work, which is the main goal for both. Understanding the dentist to technician's work smoothes their work and gives them perfect results. On the other hand, the technician knows the patient's demand will be done by the dentist and he is the unknown soldier, therefore, Overcoming the difficulties of the technician means maintaining the doctor's reputation. The dental revolution raised the bar for patient expectations; today's patients demand more involved and extensive procedures. To meet the needs of today's society, dental teams (clinicians and technicians) must overcome enormous obstacles [1]. The ability of the dental technician and dentist to work together effectively and communicate clearly through work authorizations is regarded essential for the manufacture of high-quality, long-lasting dental prostheses [2,3]. A poorly designed prosthesis has a clear chance of causing tissue injury because inadequate design information transmission leads to the fabrication of a prosthesis with minimal consideration of crucial clinical or biological data The ideal communication scenario is one in which the dental technician may speak with the patient and the clinician face-to-face. A meeting of this kind enables the laboratory technician to assess and collect data regarding the patient's personality, lip movement, and aesthetic needs that cannot be obtained through mounted castings or a written work authorization form [51. However, because the dental laboratory and dental office are sometimes in different locations, not all physicians and technicians can afford this luxury. Therefore, effective communication with the dental technician is seen as a barrier to the effectiveness of treatment, particularly in cases when esthetics are at stake [6,7]. A skilled technician might be able to fix minor mistakes made during preparation or cover them up and create a satisfactory restoration. Each restoration or component's design and specifics should be specified in full and in clear language for technicians [81. The technician was better able to construct successful restorations that satisfy the patient's wants and desires by using a variety of communication aids between the dentist and the patient [91. Despite the significance of such a wide variety of variables, laboratory mistakes have been generally blamed for the poor quality of dental prostheses. "Laboratories where the creation of fixed partial dentures is carried out using outdated technology and workers with little experience run the risk of compromising the technical quality of fixed prosthodontic work" [10, 11]. Before sending materials to the dental laboratory, the dentist must not only give the technician clear written instructions but also offer accurate impressions and follow the right infection control procedures. Using a suitable tray, the final impression should be created from an elastic material

that is dimensionally stable [3]. At the end of the day, the dentist realizes how crucial it is to collaborate with the dental technician when it comes to treatment planning, especially for more complicated situations. Building trust in all situations and establishing a sense of teamwork with the dental laboratory technician are two benefits of excellent communication [12]. However, the purpose of this study was to evaluate the communication between dentists and laboratory technicians for fabricating fixed partial dentures (FPDs) in private dental laboratories in the Tripoli area.

2. Methods

A sample of dental laboratories in Tripoli city was randomly selected. A self-administered questionnaire, figure (1) was constructed and distributed to 25 private laboratories involved in the study, part of them visited without prior appointment and immediately the chief technicians asked to complete the questionnaire. Others were emailed to the dental technicians working on fixed prosthesis fabrication. 150 questionnaires were distributed. A total of 130 questionnaires were collected from them (n = 130).

A questionnaire, which comprised 20 questions, was piloted by 5 dentists and 5 clinicians in light of their feedback and modified for the study. It included separate questions such as: Regarding Technician Identification... .. Regarding communication with the doctor... Types of fixed prosthesis.... Regarding the impression.... Shade selection.... Restoration construction. The survey used in this study was created with a specific focus on the dental laboratory technician's perceptions of communication between the dental clinic and dental laboratory during clinical sequences, strategies for improving communication between the dental laboratory and

dental clinic, and any potential insights for technical work that could be done incorrectly and result in misunderstandings [13]. Data were collected and analyzed statistically with Statistical Package for

Assessing Clinical Communication for Fixed Prosthodontics Construction between Dental Laboratories and Dentists Choose the proper answer

Social Sciences (SPSS) version 25 software, Pearson's Chi-square test was also used for cross-tabulation analysis for the comparison of proportions of all parameters. p-value < 0.05 was considered statistically significant.

Regarding Technician Identification

QI- Academic Certificate: Cl Technician. o Dentist.

Q2- Nationality:

Libyan. Foreigner.

Q3- Gender:

Male. Female.

Q4-Years of work:

Less than 5 years.5-10 years. More than 10 years.

Regarding communication with the doctor

Q5- Methods of communication with the doctor: c] Verbal by phone. Cl By Email.

Cl Written prescriptions. o Written formula.

Q6- Do you try to satisfy the doctor or just do you work?

Satisfy the doctor, firstly. Sometimes Never.

Q7- Do you force by a doctor to do the special technique?

c] Sometimes. c] A lot of time. o Never.

For any type of fixed prosthesis

Q8- Do you share with a doctor for selecting the type of restorations (PFM, All ceramic, Zircon)?

c] Sometimes. c] A lot of time. c] Never. Q9- Do you select types of pontic with a doctor? o Always. o I select the type alone.

Cl Sometimes.

Regarding the impression

QIO- What kind of impression tray is frequently used to make a secondary impression?

c] Plastic stock tray. o Metal stock tray. c] Special tray.

QII- What type of secondary impression material do you prefer to work on?

o Alginate impression material.

o Rubber impression material. o Digital.

Q12- Has the dental impression been disinfected adequately by the dentist?

o Sometimes. o Never.

Q13- Do you explain your reasons for requesting a doctor's secondary impression again to the doctor?

o Always. o Sometimes. o Never.

Regarding shade selection

Q14- Do you do the same color of dentist choice?

o Always. o Sometimes. o Never. Q15- What is the method of shade selection? o Photographic picture. o Shade guide. o Digital shade guide.

Regarding restoration construction

Q16- Is the bite always registered by the doctor?

o Sometimes. c] Never.

Q17- If the technical fault occurred, what do you do? o Explain the cause to doctor. Cl Try to repair without explanation. o Write a remake, only.

Q18- From your experience, most problems of fixed restoration construction are due to...

o Teeth Preparation. c] Secondary impression.

o Shade selection.

Q19- The Near between the Lab and the clinic is an effect on the result?

o No affect. o I think so, o I Don't Know.

o Never.

Q20- The communication with a doctor who had experience easier?

Yes Never.

The experience is not as good to work.

Figure (1): Survey questionnaire

3. Results

One hundred and fifty questionnaires were distributed, 130 were completed and returned with a response rate of 87% from 25 dental laboratories that participated in this study in Tripoli. The average number of experience in these laboratories was 7 years. 78.5% (n=102) of dental technicians are males while 21.5% (n=28) are females. 93.8% (n=122) of them are technicians, while 6.2% (n=8) are dentists (General Practitioners).

Table (1) showed that the telephone (43%) (n = 78) and laboratory prescriptions (24%) (n = 44) were the main communication tools used between dentists and dental technicians. Digital means, whether by written formula 22% (n=40), or by e-mail also played an important role 11% (n=20) (Figure 2).

Nearly 16.9% (n=22) of technicians stated that dentists usually include a specific type of fixed prosthesis. While 32.3% (n=42) reported that a lot of the time technicians select the type of restoration.

Table 1: The result of communication tools

		Responses		Percent of Cases
			Perce	
Methods of communication with the doctor	Verbal by hone	78	42.9%	62.9%
	By Email	20	11.0%	16.1%
	Written	44	24.2%	35.5%

	prescriptions			
	Written formula	40	22.0%	32.3%
Total		182	100.0	146.8%

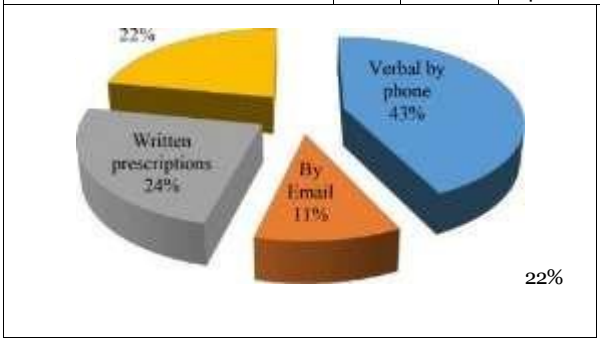


Figure 2: Ibe proportion of communication via pie charts

It may be concluded from the findings of the questions about whether a doctor obligates the technicians to perform any specific techniques for the fixed prosthesis that "sometimes" was indicated in more than 64% (n = 88) of instances and "never" was in 23.5% (n = 32). On the other hand, 53% (n=70) of dental technicians occasionally try to appease the doctor, while only 29% (n=28) are deemed to be satisfied by the doctor.

Concerning the decision of the restoration type (PFM, all-ceramic Zirconia 47.7% (n=62) dental technicians

"sometimes" consult with doctors to select restorations. Whereas, a lot of time only 32% (n=42) of them do that. The technician with more than ten years of experience tended to spend more time with the doctors when choosing the restoration than the technician in the other two groups; therefore, there was a significant correlation between Q4 and Q8. (P=O.049) Table (2) shows that 19.7% (n = 24) of the technicians reported that they always select the type of pontics with the doctor. While 37.7% (n=46) of the technicians reveal inadequate written instruction and communication between clinicians regarding pontics design figure (3). Table (3) shows Pearson Chi-Square test there was a statistically significant between Q5 and Q9 (p = 0.01), as we can see that the type of pontic will most likely be decided solely by the technician (answer to Q9) when the method of communication with doctors was either by email or verbal by phone while interacting with the doctor via a written prescription, is frequently chosen, so the written prescription would be the best method of co-operation (Figure 4).

Table 2: Showing pontic design options per technician or dentist

		Responses		Percent of Cases
			Perce nt	
Do you select types of pontic with Doctor	Always	24	19.7%	20.3%
	I select the type alone	46	37.7%	39.0%

	Sometimes	52	42.6%	44.1 %
Total		122	100.0	103.4%

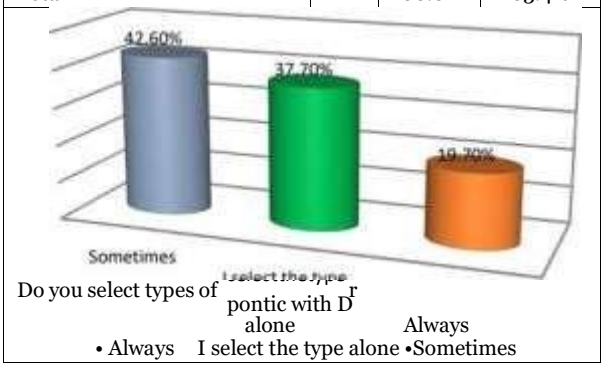


Figure 3: The percentage of pontic designs chosen Table 3: Connection between Q5 and Q9

Pearson Chi-S uare Tests		
		Q5 Methods of communication with the doctor
Q9 Do you select types of pontic with a doctor?	square	21.179
	df	9
	Si	.012

*. The Chi-square statistic is significant at the .05 level. B. More than 20% of cells in this suitable have expected cell counts of less than 5.

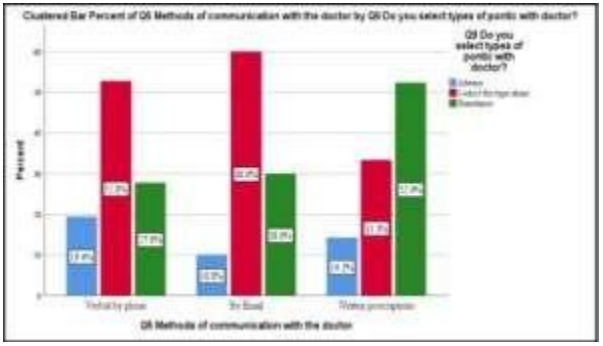


Figure 4: Pontic design is impacted by the doctor's communication techniques

The result revealed that the most common choice of impression tray was the plastic stock tray 75.4% (n =98) and the rubber impression materials were the preferred material used 74.2% (n=98) for the final impression, while 21.2% (n=28) of the impression was taken digitally. 4.5 %(n=6) of the final impression was taken by alginate impression.

Over eighty percent of the impressions (n =IIO) were visibly contaminated with blood and saliva or some attached debris. 15.4% (n=20) of the technicians were uncertain if the impression had been adequately disinfected. And 60% (n=78) of

them always explain reasons for the doctor to request a secondary impression again, while 11 % (n=14) did not explain. Regarding shade selection table (4) shows that for over sixty percent of the dental clinicians (n=84), tooth shade was determined with a classical shade guide.

More than 30% (n=46) of dental technicians received a photographic picture of the patient teeth with a shade guide. Only the minority of dental technicians 7.1% (n=10) reported the digital shades guide took it. Figure (5) shows that the most common method for shade selection was the shade guide, regardless of the method of communication between the technician and doctor. There was no statistically significant between Q5 and Q15. O. 980).

Table 4: The process of choosing a shade

		Responses		Percent of Cases
			Percen	
What is the method of shade selection?	Photograp hic picture	46	32.9%	35.4%
	Shade guide	84	60.0%	64.6%
	Digital shade guide	10	7.1%	7.7%
Total		140	100.0%	107.7%

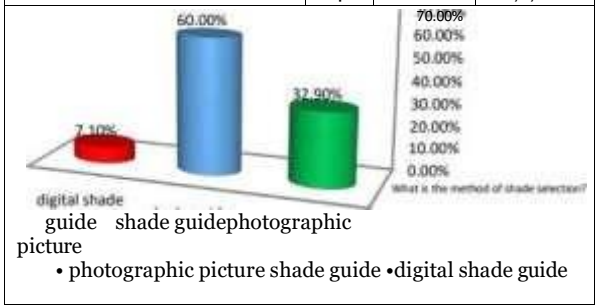
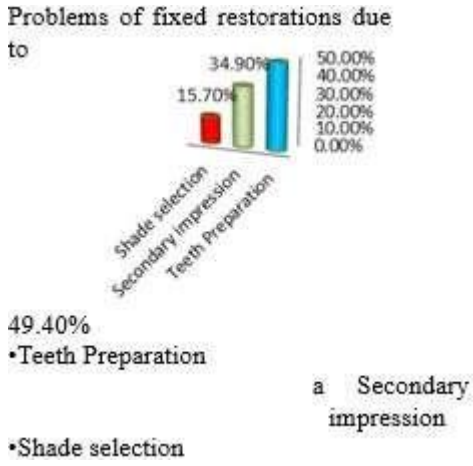


Figure 5. Percentage of a bar chart shade-choosing technique

Statistical analysis showed that over 60% (n = 80) of the cases were provided with inter-occlusal records, and 40% (n = 50) did not. Whereas 77% (n=100) of dental technicians explain the causes of technical faults to doctors if occurred, and only 14% (n=14) try to repair them without explanation. There was no statistically significant between them.

Regards to common problems of fixed restorations, the results find out the secondary impressions were 35% (n=58), teeth preparation reported 49% (n=82), while, and only 16% (n=26) for the shade selection. (Figure 6)



The result showed that the dental technicians 55% (n=72) supposed the proximity of the lab to the clinic has an effect on the result. Whereas 34% (n=44) of them did not. While 68% (n=90) reported that communication with doctors who had experience was easier than with newly graduated doctors. Whereas 30% (n=40) verified the experience is not as good as the work.

Technician Comments:

Careful preparation of the abutment teeth is required.

Make an impression using standard trays and equipment.

Details on the design and shade should be included in the written instructions for technicians.

DISCUSSION

The clinician and the technician are two faces of the same coin. The result of that will reflex for patient's prosthesis, and the extent of the harmony between them appears skill of the doctor to ideally transfer the mouth of the patient to the technician and understand the technician for that. The doctor is the eyes of the technician in the dental clinic, which is why the quality of communication between the dentist and his technician should be assessed for the importance of the quality of restoration. Therefore, the user survey (Questioner) was made to provide more information than what is found in the literature on fixed and removable prosthodontics [14].

Communication is the cornerstone to successful cosmetic dentistry/laboratory connections, according to [9, 15]. However, as the dental laboratory and dental office are frequently in different locations, a breakdown in communication between dentists and technicians through the use of prescriptions is visible even within a tight working environment [16].

Nearly 40 years ago, the issue of insufficient communication between the clinician

and laboratory was first brought to light [17], lack of enough educational exposure [18], or insufficient financial compensation is an example of potential causes that have previously been mentioned in the literature Carrotte et al., 1993 [8]. However, given that other research comparing the quality of prescriptions completed under a range indicated that the quality (or lack of quality) was comparable, the significance of financial reasons seems less likely [1,191. Another explanation for this poor communication could be that dentists rely on the technician to decide on specific prosthetic components.

According to the study, the telephone was the most common form of communication between dentists and dental technicians (43%), followed by laboratory orders (24%). For technicians, written instructions are crucial because spoken instructions may cause them to forget specifics. Written instructions also have the benefit of being regarded as legal documents [20]. When technicians require further explanation or information, a verbal conversation may be helpful. In these situations, it is crucial to speak with the other party directly or on the phone about the problem [21]. In addition to that, there was a strong association between years of work and the type of restoration the technician shared with a doctor, indicating that the technician with more than ten years of experience tended to consult with doctors more frequently than the technicians in the other two groups (less than 10 years) when selecting the restoration.

The proper pontic design is more necessary for tissue health and cleanability than the material selection. According to this study, the decision about the type of pontic design was made by 37.7% of technicians. These findings are consistent with prior studies [1], that found 34% of dentists did not include the essential pontic design, leaving the technician to make the decision. Dental technicians are valuable and important members of the oral health care team, but they are not qualified to diagnose or treat patients [8]. They are dealing with rigid objects rather than human beings.

Concerning the selected impression trays, they should be as rigid as possible to resist deformation from pressure both during the impression-making process and after removal from the mouth, in the present survey, the plastic stock tray was used in 75.4% of the cases, this comes in agreement with results obtained in a study conducted in Ireland by Lynch and Allen [12], which indicated the use of plastic stock trays in 54% of cases. Plastic stock trays were the most widely used impression trays (82.8%), in previous reports [22,23]. The widespread use of these trays may be related to their low cost or lack of dentist knowledge about their shortcomings and limitations [231.

A number of dentists who utilized dental laboratories prepared teeth ineffectively and sent unacceptable impressions; in this study, 4.5% of the final impression was taken with an alginate impression. Alginate is not recommended for fixed restorations due to its dimensional instability, which is in contrast with a study that had been conducted by Mohamed and Abu-Bakr [241, in 2010 where the surveyed dentists indicated that alginate was the preferred final impression material (68.2%). A few impressions were separated from the trays and had visibly shrunk. In addition,

preparation features were insufficient and finishing lines were illegible in half of the examples that were examined, according to technical comments. These outcomes are consistent with other reports [8,251.

In the expectation that they will compensate for the extra volume required when using stock plastic trays and that these more rigid materials will resist distortion, numerous physicians select materials with a higher viscosity. This is false; research has shown that more stiff polyvinyl siloxane materials cause the trays to bend more and the margins of restorations to open more [26,271. If impressions made with more viscous materials exhibit noticeable distortion, contact with the soft and hard tissues will undoubtedly exacerbate tray flexure [281.

In the current survey, 84.6% of the impressions were clearly blood-stained, creating a source of potentially contagious material. These results coincide with other reports. According to [29,301, 15% of impressions were clearly affected by debris. Blood on the impression was linked to an increase in the likelihood that the cervical end line would be incorrect. Moisture affects the accuracy of all elastomeric impression materials, according to numerous studies. In the clinical trial conducted by Al-AISheikh [14], these results were in disagreement with other studies that claimed that master impressions had been thoroughly disinfected. Improper master impression disinfection increases the possibility of cross-contamination in the dental office. Furthermore, the color of the teeth used in the creation of the FPD is very important to the patient in terms of aesthetics. In this study, it was discovered that while 44.7% of dental technicians consistently chose the dentist's preferred color, just a small minority 19.7% did not. These findings agree with Afzal et.al 2022[31]. A mismatch in the color of the FPD teeth increases patient unhappiness because many patients are concerned with having the right shade of teeth. If this happens, the patient may even completely refuse treatment altogether [32].

Our result found that 60% (More than half of laboratories) of the dental clinicians' tooth shade was determined with a classical shade guide, which coincided with Tulbahet.al [33], who found that over 75% of dentists used the shade guide for shade selection.

Over 38% of dentists in Tripoli did not document their patients' occlusal records. Numerous dentists submitted no occlusal information and depended on technicians to align casts in the correct occlusion. These findings are in agreement with those of another study [8]. Many dentists are ignorant of the fact that a good restoration is not the product of a technician's fault but rather of improper recording of the occlusal surfaces of prepared teeth. It only takes one air bubble to change the articulation and produce bad restorations. This fact is not consistent with the results of this research.

Even though this study had several advantages, such as the thorough questionnaire might outline the issue and fix it, there were some drawbacks. The judgments of the dental technicians included in this study were based on their interactions with various dentists, and the precision with which dental prostheses were constructed differed between different laboratories based on the equipment that was made available to them. Additionally, since the responses to the questionnaire are based on the dental technicians' subjective viewpoints, there may be a lack of objectivity.

Furthermore, because the results of the study were based on a cohort of Tripoli dental technicians, care should be taken when translating the study's conclusions to the general population. According to the study's conclusions, students should receive the appropriate training in filling out work assignment forms during both their preclinical and clinical training years. Additionally, training sessions for dental students and recent graduates must be planned to place a strong emphasis on the dentists' obligations under the law and ethical standards, as well as their involvement in prosthesis design and communication with technicians.

CONCLUSION

From the findings, it can be concluded that Good quality communication between both dental technologists and dentists is not always present.

• There were no documented instructions describing fixed prosthodontics. Dentists were primarily to blame.

RECOMMENDATION

Making another study is essential to evaluate clinician-technician communication from the dentist's perspective.

Disclaimer

The article has not been previously presented or published and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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