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A Cross-Sectional Study among Dental Lab Technicians of Qassim Province, Saudi Arabia to Evaluate the Efficacy of Instructions Provided by Dentists in Fixed Prosthesis Fabrication

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Abstract

Aim: The aim of this study is to evaluate whether the dentists in Qassim province follow the standard guidelines when providing instructions for the design of fixed dental prosthesis to dental technicians within the perspective of the technicians.

Methods: A select number of dental laboratories were randomly chosen from Qassim province (Buraydah, Unizah, Albadya, Arrass). The questionnaire was collected by face-to-face interviews with certified fixed prosthodontics dental technicians for a total of 85 dental technicians. The survey asked questions pertaining to the following areas of work authorization: clarity and accuracy of instructions, patient information, type of prosthesis, choice of materials, design and shade of the prosthesis, and type of porcelain glaze. For each question, the responses were analyzed through parametric tests (Frequencies and cross-table tests) and converted to a percentage.

Results: This study showed a lack of communication between dentists and dental technicians in relation to marginal design, pontic design, staining, type of porcelain and glaze needed for the prosthesis. This study indicates that sixty percent of prescriptions were considered inadequate and failed to meet relevant ethical and legal guidelines.

Conclusion: The effectiveness of work authorization forms indicated inadequate supply of information. Trends were indicated by the large percentage of dental laboratories citing lack of communication by the dentists, as reflected by the failure of work authorization forms.

Keywords: *Dentist; Communication; Dental Technicians; Fixed Prosthodontics; Work Authorization Form*

Introduction

The social development and changing technologies of dental treatments in the world have led to an increase in attention to the quality of prosthodontics therapy. To provide prostheses of durable and good quality, effective collaboration between dentists and dental technicians is required mainly through written instructions [1,2]. The written instructions document is the responsibility of the dentist to the technician. The document includes patient's personal details including age and gender as well as specific instructions in relation to prosthesis's type, choice of metal alloy, specifications of marginal design, shade guide and porcelain glaze's type for the prosthesis. The dentist also provides accurate impressions, opposing casts and interocclusal records for articulation. In addition to that, the dentist is responsible for providing appropriate infection control procedures for all the materials to be sent to the dental laboratory. Using these instructions and materials, the dental laboratory is responsible for the fabrication of prosthesis in a timely manner [3,4].

Failing to provide proper prescribed written instructions will result in prostheses of poor quality, which could possibly damage the oral tissues [5,6]. The written instructions also act as a protective document for the clinician and the laboratory technician by defining the responsibility of both sides [7]. Written instructions have always been considered an ethical requirement in the dentist-technician communication [8]. Previously published investigations have consistently revealed poor quality of written instructions for fixed prostho-

dontics, confirming an international trend noted in many countries including the United Kingdom [9], Wales [10], Ireland [11], China [12] and Saudi Arabia (Riyadh) [13].

However, to our knowledge, previous studies have not evaluated the quality of prosthodontic prescriptions in Qassim, where thousands of restorations are made for patients every year while no specific guidelines or policies for dental laboratory services have been introduced. Recently, the American Dental Association (2011) issued updated guidelines to improve the relationship between the dentist and the laboratory technician [14]. The main purpose of this survey is to evaluate the quality of communication between the dentists and the dental technicians in the field of fixed prosthodontics in Qassim, Saudi Arabia.

Materials and Methods

A questionnaire on specific areas of work authorization forms was used. The questionnaire is written in both English and Arabic, and the front page explains the purpose of the study. The survey covered specific areas of the work authorization concerned with fixed restoration fabrication and included the following questions: the authorization form provided by fixed prosthodontist, general dentist or undergraduate student, the patient's personal details, disinfection state, type of prosthesis, choice of metal alloy, type of ceramic, type of porcelain glaze and translucency, shade guide, preferred marginal design, and whether the technicians need more clarifications or not. Questionnaires were completed in a face-to-face interview by certified dental technicians working on fixed prosthesis fabrication in governmental and private laboratories of Qassim province. A total of 85 questionnaires were collected from them (n = 85). The survey was cross-sectional and the data were analyzed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics were used to evaluate the level of communication between dentists and fixed prosthodontics laboratory technicians in Qassim province. The responses was analyzed through parametric tests (Frequencies and cross-table tests), and converted to a percentage. The study was registered in the College of Dentistry's Research Centre, Qassim University, and ethical approval was provided (F-5003).

Results

A total of 85 dental technicians participated in this study. Approximately fifty-three (n = 45) were completed by general dentists, thirty-four by fixed prosthodontists, and only 13% by undergraduate students (Figure 1). Complete patient information was not present in ≈13% (n = 11) of cases. The disinfecting state was not indicated on the prescription in ≈39% (n =33) of cases. Almost all of written instructions were include the specific type of prosthesis to be fabricated. Approximately sixty-two (n= 53) were include the type of metal alloy and ceramic. The porcelain translucency type was mentioned in ≈70% (n= 60) while the glazing type was mentioned in ≈59%. The shade selection was specified in almost all of authorization work forms however the shade guide system was not mentioned in ≈38 of them. The Preferred occlusal staining was included in ≈75% (n= 64) of cases. Around fifty-two (n= 44) of written instructions were include the die preparation state. The preferred marginal design was specified in ≈60% (n= 51) of cases; on the other hand, about fifty percent of them were not include the preferred coping design. Almost all of cases were include the abutment teeth of FPD while the type of pontic design was mentioned in only ≈55% of them. Approximately 59% of the technicians ask for further clarifications from the dentists (Figure 2). For each question, the number of responding technicians was tabulated and converted into percentages. The results are presented in table 1. There was little variance between the undergraduate students' results, qualified dentists and fixed prosthodontists (Table 2).

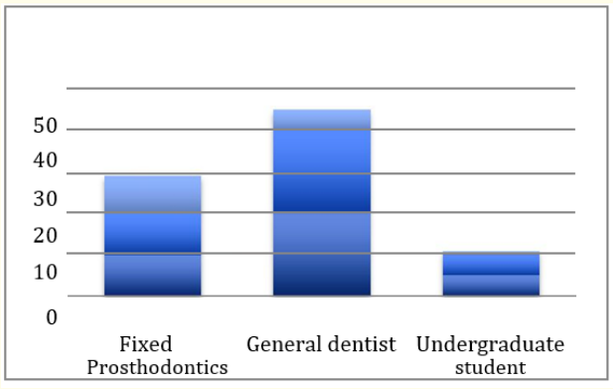

Figure 1: *The authorization form provided.*

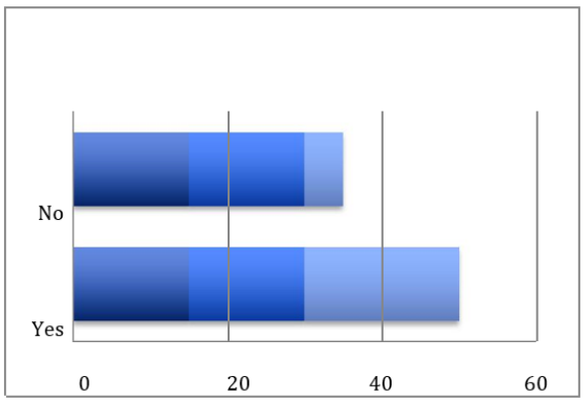

Figure 2: *Whether the technicians need further clarification from the dentists or not?*

The following questions about authorization work form whether it includes the required information or not:	
Patient's personal details (name, age...etc.)	**Responses (%)**
Always	(78.8)
Often	(8.2)
Rare	(11.8)
Never	(1.2)
Don't know	(0)
Disinfecting state	**Responses (%)**
Always	(50.6)
Often	(5.9)
Rare	(22.4)
Never	(16.5)
Don't know	(4.7)
Specific type of prosthesis (PMF, all ceramic, full metal)	**Responses (%)**
Always	(85.9)
Often	(14.1)
Rare	(0)
Never	(0)
Don't know	(0)
Type of metal alloy	**Responses (%)**
Always	(44.7)
Often	(17.6)
Rare	(16.5)
Never	(21.2)
Don't know	(0)
Type of ceramic	**Responses (%)**
Always	(45.9)
Often	(16.5)
Rare	(16.5)
Never	(21.2)
Don't know	(0)

Porcelain glaze's type	**Responses (%)**
Always	(32.9)
Often	(25.9)
Rare	(21.2)
Never	(20)
Don't know	(0)
Porcelain translucency's type	**Responses (%)**
Always	(28.2)
Often	(42.4)
Rare	(18.8)
Never	(10.6)
Don't know	(0)
Specific shade selection	**Responses (%)**
Always	(72.9)
Often	(24.7)
Rare	(2.4)
Never	(0)
Don't know	(0)
Type of shade guide system	**Responses (%)**
Always	(45.9)
Often	(16.5)
Rare	(16.5)
Never	(21.2)
Don't know	(0)
Preferred occlusal staining	**Responses (%)**
Always	(35.3)
Often	(40)
Rare	(17.6)
Never	(7.1)
Don't know	(0)
Die preparation state	**Responses (%)**
Always	(37.6)
Often	(14.1)
Rare	(14.1)
Never	(28.2)
Don't know	(5.9)
Preferred marginal design	**Responses (%)**
Always	(28.2)
Often	(31.8)
Rare	(22.4)
Never	(14.1)
Don't know	(3.5)
Preferred coping design	**Responses (%)**
Always	(23.5)
Often	(18.8)
Rare	(10.6)
Never	(38.8)
Don't know	(8.2)

Type of Pontic design in case of FPD	**Responses (%)**
Always	(34.1)
Often	(21.2)
Rare	(30.6)
Never	(14.1)
Don't know	(0)
Abutments teeth for FPD	**Responses (%)**
Always	(67.1)
Often	(21.2)
Rare	(7.1)
Never	(4.7)
Don't know	(0)

Table 1: *Responses from laboratory technicians converted to percentage.*

		Further clarification from the dentist	
		Yes	**No**
The authorization form provided by	Fixed prosthodontists	18	11
	General dentists	31	14
	Undergraduate students	1	10

Table 2: *The variance between the undergraduate students' results, general dentists and fixed prosthodontists regarding to the need of the technicians for further clarifications.*

Discussion

The authorization work forms have been the most frequently used and abused way of communication between the dentist and the laboratory technician [3]. In 1990, Goodacre offered specific recommendations for future dentists with regard to the dental laboratory [15]. In 1994, a program was developed to improve the quality of laboratory submissions and the returned product [16]. Recently, the American Dental Association has issued updated guidelines to improve the relationship between the dentist and the laboratory technician [14]. A recent study showed that the specific details of a work authorization form (such as choice of metal, marginal design, staining, and type of pontic) are most often poorly provided by dentists. This could be due to incomplete undergraduate training in the area of work authorization writing or the dentists considering certain information in the work authorization sheet to be more important than other information. Additionally, the lack of details provided could be due to dentists' assumption that the laboratory will use certain materials or designs the prosthesis in a specific manner.

In our survey around forty percent of technicians indicated that work authorization forms were complete and legible to provide the prosthesis. On the other hand, approximately sixty percent (n= 50) of dental technicians asked for further clarification from the dentists, so that they can perform their best service. This result was comparable to what was reported by a previous study that have consistently revealed poor quality of written instructions for fixed prosthodontics, confirming an international trend noted in many countries including the United Kingdom [9], Wales [10], Ireland [11], China [12] and Saudi Arabia(Riyadh) [13]. Eighty-seven percent of respondents reported that the patient personal details on the prescription were indicated between 75% and 100% of the time. As fixed prosthesis are 'dental precision castings', the need for a dimensionally stable, accurate impression and disinfected is essential. The potential for transmission of infective agents from the dental clinics to the dental laboratory via inadequately disinfected impressions has previously been demonstrated [17]. However, more than forty percent of dentists did not mention the disinfecting state in their prescription. Almost all of dental technicians responded that the dentists had indicated the type of prosthesis they desired for the patient; however, nearly thirty-eight percent of the work authorizations received did not specify the metal alloy to be used for prosthesis fabrication. The choice of an alloy depends upon a variety of factors including cost, rigidity, ease of finishing and polishing, corrosion resistance, compatibility with specific porcela-

ins, and personal preference [18]. Dentists have the legal and ethical responsibility for the selection of the alloys used. Nearly forty-five percent of authorization work forms have not included the preferred pontic design even though it is more important for cleans ability and good tissue health than the choice of materials. Approximately forty percent of the work authorizations did not indicate a preferred margin design, which should be clear by dentists before tooth preparation is begun. The dentist subsequently can design the prosthesis to accommodate various esthetic and functional schemes, and then delegated to the dental technicians to fabricate the restoration according to the needs of the patient. Tooth shade information is essential to the dental technician. Almost all of the technicians were satisfied with instructions given to them indicating the shade of the fixed restoration, also ≈62% of the respondents noted that the type of shade guide was mentioned. A diagram of a tooth that allows specification of multiple shades is very helpful to the dental technician, especially in the fabrication of crowns in the esthetic region. Finally, when the desired contour and occlusion have been achieved, the restoration must receive a surface treatment like auto glazing, over-glazing, or polishing [19]. Around forty percent of the technicians reported that dentists usually did not indicate the type of porcelain glaze and translucency. Almost all of the technicians reported that dentists typically indicated the specific type of prosthesis needed for the case, yet ≈38% did not mention the type of ceramic. This responsibility should not be delegated to the dental laboratory technicians. In most of the cases, the choice of materials needed for the fabrication of the prosthesis left for the dental technicians. With lack of adequate communication, the fabrication, and completion of the cases will be difficult for the technicians. A previous study suggested the following to improve dentist-technician integration and communication [20]:

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; and
7. Promoting integrated education of dental and laboratory technology students.

It should be noted that this study has certain limitations. First, this study was conducted in Qassim province, which is considered as a small community with limited number of dental clinics. However, the sample size was representative. Another limitation was the lack of objectivity in answering the questionnaire because it depends on the subjective perspective of the technicians. However, responses were cross-validated by secondary sources. The last limitation was that this study considers Saudi Arabia, therefore, comparability to other nations is limited.

Conclusion

The quality of communication between dentists and dental technicians in Qassim province can be considered inadequate.

The following recommendations are essential to improve the level of communication:

- Dental students should be educated about proper work authorization form writing;
- Dental technicians have to be able to refuse work authorization forms that lack standard information; and
- Standard guidelines for the required information in the work authorization form should be established in Qassim province to improve the quality of service.

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