

Review Article

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Quality of Communication between Dental Technicians and Dentists during the Fabrication of Removable Partial Dentures in Casablanca, Morocco

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ABSTRACT

Introduction: Communication between the dentist and the dental laboratory technician plays an essential role in the success of prosthetic treatment. The purpose of this study was to evaluate and analyze the quality of communication between dentist and dental technicians, and to highlight the different constraints encountered by the laboratory technician when making removable partial prostheses.

Materials and Methods: This is a cross-sectional descriptive study conducted among 94 dental technician working in the private sector in Casablanca. A questionnaire was distributed to the dental technicians. It included five sections : Identification, communication methods, prosthetic design, communication difficulties and the added value of digitizing the prosthetic chain. Data were statistically processed using SPSS 20 software.

Results: A total of 94 dental technicians working in Casablanca were interviewed. All these laboratory technicians (100%) used the laboratory form as their main means of communication. Additional means of communication were used to complet missing information (phone, photo sharing, e-mail). 72.3% of dental technicians designed the metal framework for cast partial dentures themselves and 67% of prosthetists said that digitizing the prosthetic chain could improve dentist - dental laboratory technician communication.

Conclusion: Effective communication between dentist and dental technician is essential for successful prosthetic treatment and patient satisfaction.

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Introduction

Cast Partial Dentures (CPD) are designed to restore functions such as phonation, mastication and esthetics, and to maintain the health of the masticatory system by ensuring stability through improved distribution of occlusal loads on the remaining teeth, thus preventing their undesirable movement [1]. Producing a high-quality prosthesis, both in the dental practice and in the prosthetic laboratory, requires genuine teamwork and perfect coordination between the dentist and the dental technician [2,3].

Prosthesis design is a fundamental step in prosthetic management. Inadequate communication of detailed information to the dental laboratory technician leads to the fabrication of a prosthesis without regard to important clinical or biological factors and this can have deleterious effects on oral tissues and, consequently, on the patient's health. The dentist must communicate information to the dental technician clearly and unambiguously [4,5].

Several means of communication exist to facilitate the transmission of information from the dental office to the dental laboratory, and consequently the success of the prosthesis. Close collaboration between the dentist and the dental laboratory technician is essential for successful prosthetic treatment and patient satisfaction. It requires respect, mutual trust and knowledge of both professions. When it concerns communicating clinical details to the laboratory, the more precise and comprehensive the instructions, the easier it will be to carry out the prosthetic project and the better the final result [3].

The aim of this work is to evaluate and analyze the quality of communication between the dentist and the dental technician, and to highlight the various communication constraints faced by the laboratory technician during the fabrication of CPD.

Materials and Methods

This is a descriptive cross-sectional epidemiological study. It concerned all laboratory technicians in Casablanca.

Private prosthetic laboratories located in Casablanca that manufacture cast partial dentures (stellite), qualified dental technician (public or private) and dental technician who agreed to take part in the survey were included in our study. Excluded from this study: Laboratories without a license and exclusive fixed prosthesis laboratories.

Data were collected using a questionnaire containing 21 questions.

The questionnaire was divided into 5 main sections

- Identification of the laboratory technicians participating in the study.
- Means of communication between the dental office and the dental laboratory.
- Quality of communication during cast partial denture design and manufacture.
- Office-laboratory communication difficulties.
- The added value of digitizing the prosthetic chain.

Data were statistically analyzed using SPSS 20 software (Statistical Package for the Social Sciences), at the Laboratory of Community Health Epidemiology and Bio-statistics at the Faculty of Dentistry of Casablanca-Morocco.

Results

A total of 94 dental technicians working in Casablanca were interviewed. All these laboratory technicians used the laboratory form as their main means of communication with the dentist. The laboratory form always included: Name of the dentist (88.3%), name of patient (89.4%), gender (55.3%), type of prosthesis or step to be performed (96.8%), deposit date (93.6%), return date (87.2%). Dentists rarely mentioned: patient age (36.2%), face shape (59.6%) and skin color (39.4%). 85.1% of dental technician surveyed felt that written communication alone was insufficient (Table 1).

As additional means of communication with the dentiste: 98.9% of dental technicians said yes to the use of phone, 89.4% said yes to the photo sharing, and 41.5% said yes to the use of that e-mail to complete missing information (Table 2).

Table 1: Principal Means of Communication

	N	%
Laboratory Data Sheet	94	100
The Lab form always Included		
Patient's name	84	89,4
Gender	52	55.3
Type of prosthesis or step to be performed	91	96,8
Return date	82	87.2
The Laboratory Sheet Rarely Included		
Patient age	34	36,2
Face shape	56	59,6
Skin color	37	39,4
Written Communication is Insufficient	80	85,1

Table 2: Additional Methods of Communication

	N	%
Phone call	93	98,9
Written telephone messaging	17	18,1
Photo sharing	84	89,4
Video sharing	27	28,7
Mail	39	41,5
Dental office visit	32	34

72.3% of dental technicians designed the metal framework for CPD themselves, and 25.5% did so in consultation with the dentist. According to 40.4% of the laboratory technicians, dentists rarely carried out dental preparations (such as dental supports, guiding plan) and for 93.6% of these technicians, dentists always mentioned the shade of the prosthetic teeth on the laboratory form. The dental technicians noted that dentists rarely mentioned the following on the laboratory form: The type of clasp and its location (38.3%), the materials to be used (48.9%), the occlusal concept (36.2%), the shape and size of the prosthetic teeth (46.8%). To discuss prosthetic projects, 46.8% of dental technicians opted for telephone interviews and 31.9% scheduled meetings with the dentist.

In the case of non-conforming prosthetic work, 69.1% of dental technicians contacted the dentist to explain the problem and decide together on the appropriate course of action.

The possible sources of conflict cited by the dental technicians in our study were

- Delayed payment of fees for 85.1% of prosthetists.
- Insufficient time to complete the work for 58.5% of prosthetists.
- The dentist's written instructions were incomplete for 51.1% of dental technicians.

Table 3: Quality of Communication in the Design of Cast Partial Dentures

Variable	(N)	(%)
The Design Diagram of Removable Partial Denture:		
Dentist	2	2.1
Dental Technician	68	72.3
Both of them	24	25.5
Dental Preparations		
Always	6	6.4
often	29	30.9
rarely	38	40.4
never	21	22.3
Type of Clasp and its location		
Always	16	17
often	29	30.9
Rarely	36	38.3
Never	13	13.8
Materials to be used		
Always	12	12.8
often	20	21.3
Rarely	46	48.9
Never	16	17
Shape and size of prosthetic teeth		
Always	11	11.7
often	19	20.2
Rarely	44	46.8
Never	20	21.3
The occlusal concept		
Always	9	9.6

Often	31	33
Rarely	34	36.2
Never	20	21.3
Prosthetic tooth shade		
Always	88	93.6
often	5	5.3
Rarely	0	0,00
Never	1	1.1
Discussion of clinical cases		
Phone	30	31.9
Meeting	44	46.8
Other	20	21.3
Quality of the dentist's written instructions:		
Clear	18	18
Guide	52	55.3
Poor	23	24.5
No written information	1	1.1
Attitude to non-conforming work:		
Return the work, explaining the problem in detail on the lab sheet	21	22.3
Contact the dentist, explain the situation and decide together what to do	65	69.1
Trying to correct the problem in the lab	8	8.5

Table 4: Communication Difficulties between Laboratory Technicians and Dentists

Variable	(N)	(%)
Conflict sources:		
Delayed payment of fees	80	85.1
Insufficient deadlines for work completion	55	58,5
Incomplete instructions	48	51,1
Dentist's lack of experience	29	30.9

- The average satisfaction score for prosthetists regarding the quality of communication with dentists was 6.1 ± 1.7 ; the lowest value assigned to this level of satisfaction was 1/10 and the highest was 9/10.
- Below 5: is considered low.
- Between 5 and 7: is considered moderate.
- Above 7: is considered good.
- 67% of prosthetists said that digitizing the prosthetic chain could improve communication between the dental practice and the prosthetic laboratory. For 54.3% of dental technician, the benefits of digitization would include faster prosthetic work, more precise and fluid communication for 40.4% of dental technicians, and traceability of prostheses for 23.4%.

Table 5: Contribution of Digitalization of the Prosthetic Chain to Communication between the Dental Practice and the Prosthetic Laboratory

Variable	(N)	(%)
Digitization will improve dentist-laboratory communication:		
Yes	63	67
No	31	33
Points of interest		
Time saving	51	54,3
More precise, fluid communication	38	40,4
Prosthesis traceability	22	23,4
Others	6	6,4

Discussion

This study revealed that the main means of communication between dentists and dental technicians is the laboratory form. This form is the essential reference for the manufacture of the prosthesis, and the information provided by the dentist must be clear and effective. Our results are in line with those of the study conducted by Haj Ali R. et al. in the United Arab Emirates, on communication with the dental laboratory concerning the design of removable dental prostheses. They stated that 84.2% of dentists frequently communicate via a laboratory form [6]. These results show the important role played by it in transmitting and archiving information relating to clinical cases.

However, a study by M. Gueye et al. in DAKAR showed that the telephone was used by 73.3% of dentists as their principal means of communication with the laboratory, while the laboratory form was used by only 16.7% of clinicians [3].

An other survey carried out in Saudi Arabia in 2020 by M.Z. Nassani et al. showed that only 8.6% of dentists used the laboratory form to communicate with laboratory technicians [7]. The provision of clear and comprehensive written instructions by the dentist, and their application by the technician when fabricating the prosthesis, represents an ethical and legal obligation for both [8].

The results of this study showed that this laboratory form almost always included: The name of the dentist (88.3%), the name of the patient (89.4%), gender (55.3%), type of prosthesis or work steps to be carried out (96.8%) and return date (87.2%). On the other hand, dentists rarely mentioned: Patient age (36.2%), face shape (59.6%) and skin color (39.4%). This could make the instructions written on this form insufficient.

This result is comparable to those of other authors. In 2018, a study carried out in Khartoum state, Sudan, revealed that dentists always mentioned the following on the lab form: Patient age in 54.5% of cases, patient gender in 72.7% of cases and the return date of the prosthetic work in 81.9% of cases [9].

In 2011 in the UK, a survey on the quality of the laboratory form showed that it contained: The name of the practitioner (75%), patient information (81%), the date of deposit of the prosthetic work (74%), and the date of return in 84% of cases [8].

The presence of these parameters (age, sex, face shape and skin color) is of crucial importance to the technician for the fitting of prosthetic teeth and the smile design [9]. The indication of the date of deposit and return of work is also essential for organization within the prosthetic laboratory, as well as within the dental practice [10].

Any lack or failure to communicate one or more parameters can alter the design and then the manufacture of the cast partial denture, resulting in functional and aesthetic prosthetic failure.

Regardless of how meticulously the dentist provides the dental technician with the essential instructions for manufacturing the prosthesis, the dental technician may sometimes need additional information, especially in complex cases. As additional means of communication: 98.9% of dental technicians answered yes regarding the use of telephone calls, 89.4% regarding the sharing of photos, and 41.5% of dental technicians completed missing information by e-mail.

According to a study carried out in the UK in 2009, 79% of laboratory technicians communicated by telephone, and 35% by personal visit [11]. In 2022, a study carried out in Pakistan by Afzal H. et al. on the evaluation of the quality of communication by laboratory form between dentist and dental technician in fixed and removable prosthetics showed that almost 44% of dentists chose to discuss cases in person, 38.6% by telephone and 8.8% preferred to communicate with the dental technician by e-mail [12].

These results contradict those found by Tabriz, Iran, who showed that only 24.7% of prosthetists contacted the dentist, while the majority refused to contact the dentist for further information [13].

Despite the diversity of methods of communication used in dental practice, the telephone call remains the practical and rapid means of transmitting and receiving explanations and additional information relating to clinical cases.

It is worrying that in the present study, 72.3% of dental technicians drew the metal framework for cast partial dentures themselves, and 25.5% of these did so in coordination with the dentist. These results are in line with those of a study carried out in Riyadh, which found that less than 25% of dentists have included the framework design in the lab form [7].

Another study, carried out in Sudan also found that 54.5% of dental technicians design the diagram themselves; however, there may be written (45.5%) or verbal (54.5% of cases) recommendations by the dentist [9].

In contrast, a study carried out in Malta showed that 59.4% of dentists design the diagram of the metal framework [14].

The design of the frame is the result of a clinical approach based on an analysis of anatomical-physiological factors, in line with the biomechanical and aesthetic requirements that are a decisive in prosthetic success. The diagram must be drawn with skill and precision, to ensure effective communication between dentist and technician. If it is of poor quality, it may be misinterpreted and, as a

result, the shape and position of components may be inappropriate. The design scheme can be clarified by using color coding to identify the different components of the metal framework. [15].

Dental preparation is an essential step in the process of manufacturing a cast partial denture. Preparation of rest seats produce a favourable tooth surface for support. It also prevent interference with the occlusion. Preparation of the guide surfaces ensures stability and improve appearance of the cast partial denture [16].

In this study, dental technicians stated that dentists rarely perform dental preparations (40.4%). According to a study in Tunisia on the importance of dental support when designing a cast partial denture in private practice, 98% of dental technicians confirmed that they received impressions without prior dental preparation [17]. Nassani et al. in Saudi Arabia, in 2020, also showed that only 16.7% of dentists performed the dental preparations required for the design of a CRP [7].

In the study carried out in the USA by Yarborough et al. in 2021, only 27.5% of respondents stated that dental preparations are properly set up to receive a metal frame. This is slightly higher than in 2009(14.75%) [18]. According to another study carried out in Iran, 35% of dentists did not perform dental preparations, while 55.3% performed insufficient preparations [13].

In this study, the dentist rarely mentions the following information on the laboratory form: the clasps type and their location (38.3%), the materials to be used (48.9%), the insertion axis (44.7%), the occlusal concept (36.2%), the shape and size of the prosthetic teeth (46.8%), and the aesthetic project (53.2%). In almost all cases (93.6%), the dentist specifies the shade of teeth to be used. these results are in agreement with those of study carried out in Saudi Arabia in 2020, the location and type of direct retainers were identified in around 20% of cases, and the number and location of rests were determined by the dentist in 21% [7]. Another study carried out in the UK in 2011, reported that the type of material required for prosthetic design was not specified 45% (n = 68) [8]. Another study in Pakistan showed that over half of dentists (56.5%) specified the material to be used for cast partial dentures [12]. According to a study carried out in Iran, 72.77% of laboratory technicians stated that the choice of prosthetic teeth was often ignored in written instructions by dentists, which can affect the functional and aesthetic success of prosthetic rehabilitations [13].

[13]. These results could be explained by the fact that many dental students have limited knowledge of laboratory technical steps, leading them to depend on the expertise of the laboratory technician [5]. Strict application of the principles of cast partial denture design and fabrication, guided by mechanical, biological and esthetic prosthetic requirements, ensures satisfactory long-term results.

Regarding the quality of the instructions written by the dentist on the laboratory form, 55.3% felt that they were a guide, and 23% responded that they were insufficient. These results are in line with those of the study carried out in Malta. 50% of dental technicians rated the instructions written on the laboratory form as good to excellent [14]. However, In the survey carried out in Oregon (USA), 44.4% of dental technicians said that the instructions written by the dentist were incomplete, and that part of the design was delegated to the laboratory technician [5]. the study carried out in Iran Tabriz also showed that 50.6% of technicians rated the

instructions written by the dentist as insufficient, and that most of the design work was left to the laboratory technician [13]. In 2005, a study carried out in the UK and Ireland showed that instructions written by dentists were insufficient or non-existent in 47% of cases [19]. A study carried out in India showed a similar result in relation to written instructions, which were poor in over half the cases (58%), so the dental technician had to consult the dentist for clarification [4].

The present study showed that the majority of dental technicians (46.8%) discuss clinical cases with their colleagues by telephone, and 31.9% through meetings. This inter-team sharing of information helps to secure and guarantee continuity of care and the quality of patient management. The aforementioned meetings are used to discuss clinical cases, and different technical and prosthetic solutions.

Although it may initially represent a loss of chairside working time, it will lead to better control of everyone's work, and therefore to greater efficiency and patient satisfaction. For the dental technician, this time for discussion with his colleague will also demonstrate recognition of the importance of his work

. Good communication between dentist and dental technician not only improves the final result of the prosthesis, but also avoids unnecessary delays and rework, and therefore saves time for dentist, dental technician and patient.

In this study, the most common reason for conflict was late payment of fees (85.1%), followed by insufficient time to complete the work (58.5%) and incomplete written instructions in over half the cases (51.1%). Lastly, dentist's lack of experience (30.9%). These results are similar to those of a study carried out in India. It showed that 58% of the technicians regarded the time provided to finish the case as insufficient [4].

The average satisfaction index of dental technicians with their relationship with dentists was 6.1 out of 10 \pm 1.7. In 2009, a survey of UK dental technicians' views on the effectiveness and teaching of practice-laboratory communication showed that 48% rated communication with newly qualified dentists as better than with those with experience [11]

The enormous contribution of digitization/CAD/CAM is undeniable. Fast, efficient digital design avoids ambiguities in the transmission of clinical information.

In the present study, 67% of dental technician stated that digitalization of the prosthetic chain will improve dental office-prosthetic laboratory communication. They also reported that digitization will save them time (54.3%), enable more precise communication (40.4%) and improve traceability (23.4%). The traceability is one of the reasons for investing in CAD/CAM, since it enables all the information in the patient's medical file to be archived, such as the design of the metal frame and the reference of the prosthetic teeth. These informations are of considerable interest in the case of prosthetic reintervention for a variety of reasons (Clasp fracture, loss or damage to prosthetic teeth) [20]. Suggestions were put forward to improve the quality of dental office-laboratory communication to ensure the success of the prosthetic project

- Include courses on dental office-laboratory communication in the basic training of dental technician and prosthetic laboratory technician students.
- Make future dentists aware of their legal and ethical

obligations in the design of dental prostheses.

- Include diagram design and legend in the laboratory form.
- Improve the quality of dentist-dental technician communication by integrating new technologies.
- Encourage attending continuing education courses for technicians and dentists to keep up with advances in dentistry.
- Use new digital technologies (digital photography, web-based communication platforms, CAD/CAM, etc.).

Conclusion

In conclusion, prosthetic treatment in dentistry involves clinical and laboratory steps in which both dentist and laboratory technician are involved, hence the need for effective and quality communication.

This study has highlighted a number of gaps in communication between the dentist's office and the dental laboratory. Indeed, a significant number of forms sent to laboratories were poorly written and lacked important information about the prosthetic design. Furthermore, written communication is often inadequate, particularly in complex cases where the use of complementary methods is essential.

Effective communication between dentist and dental technician using well-written information including design details will improve RPD quality and patient satisfaction.

Including courses on communication between the dental office and the laboratory in the initial training program for dentists and dental laboratory technicians will have a positive impact. A common, precise vocabulary is essential to improve the quality of communication and prevent conflicts between the two collaborators.

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