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Original Article

Evaluating Communication through Work Authorization between Dentists and Dental Technicians for Fixed Prosthesis

Anam Fayyaz Bashir[1*], Ussamah Waheed Jatala[2], Moeen ud Din Ahmad[1], Aisha Arshad Butt[1], Aneela Qaiser[3] and Nadia Munir[4]

[1]Department of Operative Dentistry, Lahore Medical and Dental College, Lahore, Pakistan
[2]Department of Prosthodontics, Lahore Medical and Dental College, Lahore, Pakistan
[3]Department of Science of Dental Materials, FMH College of Medicine and Dentistry, Lahore, Pakistan
[4]Department of Science of Dental Materials, Avicenna Medical and Dental College, Lahore, Pakistan

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***Corresponding Author:**
Anam Fayyaz Bashir
Department of Operative Dentistry, Lahore Medical and Dental College, Lahore, Pakistan
dranam.fayyaz@gmail.com

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ABSTRACT

Communication within the dental profession can be challenging and may affect the quality of prostheses delivered to the patient. A methodical investigation into the dynamics between dentists and dental technicians is lacking in Lahore. **Objective:** To assess adequate practice of communication between dentists and dental technicians through work authorization for fixed prosthesis. **Methods:** This cross-sectional study was conducted in dental laboratories of Lahore. A questionnaire concerning work authorization forms was distributed to 80 dental technicians through Google Forms and hard copies. The survey concentrated on inquiries related to various aspects of work authorization, including gender, years of experience, impression disinfection, patient demographic data, impression materials used, fixed prosthesis design, and shade selection. An adequate work authorization was assessed in the end. Statistical analysis was conducted SPSS version 25.0 and was analyzed using chi-square, with significance set at $p \leq 0.05$. **Results:** Out of the 80 survey forms disbursed, only 73 completely filled responses were accepted, giving a response rate of 91%. Information regarding patient demographic data (19.2%), patient photographic record (5.5%), pontic design (13.7%), margin design (37%), surfaces covered by metal (9.6%) and occlusal scheme (6.8%), were all on the inferior side of the scale ranging below 40%. Adequate practice of work authorization was discouraging, at only 17.8%. **Conclusions:** Poorly filled work authorization forms lead to patient and dentist dissatisfaction with fixed dental prostheses. This highlights the importance of clear communication between technicians and dentists. Dental students should learn to complete these forms during their training.

INTRODUCTION

Communication involves exchanging information verbally or non-verbally, which can include speech, writing, charts, maps, and images [1]. People use these channels to achieve mutual understanding between the sender and receiver of information. Communication within the dental profession can be challenging due to the diverse roles within dental offices, including dental assistants, hygienists, and administrative staff. Similarly, dental laboratories involve technicians along with various support personnel like delivery staff, technical advisors, and marketing professionals [2]. Effective communication is vital in dentistry for collaborative success. However, inadequate dentist-technician communication can lead to quality, time, and cost issues, impacting patient satisfaction [3]. Dentists often attribute permanent prosthesis remakes to lab errors, even with accurate prescriptions, as labs may deviate from desired materials and procedures due to misinterpretation. Some dentists delegate form completion to assistants, leading to communication errors and clinically significant issues like inadequate prostheses [4]. Digital impression techniques, introduced in the 1980s, offer an alternative to conventional

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methods, revolutionizing fixed reconstructions with CAD/CAM technologies. However, their prevalence remains low in Pakistan [5, 6]. By developing constructs directly on a computer screen and eliminating actual working models in the process, computer technology has altered the manufacturing process [7]. Sadly, their prevalence of use is yet to catch up in Pakistan. Traditionally, dentists conveyed their needs to technicians through handwritten prescriptions, establishing unidirectional communication. However, the adoption of work authorization forms, which are detailed orders specifying the work to be done and materials to be used, streamlines communication and minimizes the likelihood of mistakes [8]. Hence, enhancing communication avenues, such as standardized work authorizations, is imperative for ensuring effective dental procedures. The Medical Devices Directive (Directive 93 / 42 / EEC) of the European Union affirms that the dental practitioner bears the obligation of giving the dental technician precise instructions[9].

There is not much data about laboratory communication in Pakistani local settings. Communication through work authorization forms between dentists and technicians in private laboratories and dental colleges remains unexplored in Lahore. The objective of the research was to assess the adequate practice of communication between the dentist and dental technician through work authorization by looking at specific areas for fixed prostheses. The rationale is that the study will underscore the need for the incorporation of work authorization forms in the BDS curriculum.

METHODS

This cross-sectional research was conducted from October 2023 till January 2024, after obtaining approval from Institutional Review Board of Lahore Medical and Dental College, FD/1499/24. The study was confined to dental technicians of Lahore who fabricated fixed prostheses, with dental technician students being excluded. These technicians worked in various locations such as commercial dental laboratories or laboratories associated with dental colleges. The survey was prepared after a review of the literature and discussions with subject experts. There were only a few short and straightforward survey questions. They were left with only two possibilities, not a multitude of options. This facilitated faster and easier responses from participants, resulting in more accurate data for the study. It was then validated after conducting a pilot study. The researchers employed the non-probability convenience sampling method and determined the sample size using a formula derived from the WHO calculator. For this study, a 95% confidence level was chosen, with the desired margin of error at 2%, while maintaining the power of the test of 80%. Therefore, a sample size of 81 was calculated. A self-administered, closed-ended survey, through Google forms and hard copies, was distributed among the selected sample of dental technicians of Lahore. The participants' identities were kept confidential, and informed consent was obtained. After a week, a reminder was sent if they had failed to submit a response using online forms. The following aspects of work authorization were covered by the survey: gender, years of experience, impression disinfection, impression materials used, fixed prosthesis design, and shade description. An adequate work authorization was assessed in the end. SPSS version 25.0 software was used for data analysis, and statistical methods for data collection and analysis were followed. To compare proportions across various parameters, cross-tabulation analysis was performed using the Chi-square test for association. When determining associations, a p-value of less than 0.05 was deemed statistically significant.

RESULTS

Out of the 81 survey forms disbursed, only 73 completely filled responses were accepted, giving a response rate of 90%. Incomplete forms along with un-submitted responses were discarded. Table 1 states the frequency of the recorded data along with responses. The mean age of the dental technicians was 33.84 ± 10.6 years. 60 (82%) of technicians stated that alginate was the most common material used to record impressions by dentists, followed by rubber-based impressions with a count of 13(18%).

Table 1: Details of Participants and Frequency of Responses

S. No.	Demographics	Variables	Frequency (%)
1	Gender	Male	70 (95.9)
		Female	3 (4.1)
2	Experience	Less than 5 years	33 (45.2)
		More than 5 years	40 (54.8)
3	Technician certification	Achieved	26 (35.6)
		None	47 (64.4)
	Questions	**Reponses**	
		Yes	**No**
1	Was the master impression disinfected by the dentist?	57 (78.1%)	16 (21.9%)
2	Do dentists provide patient's information regarding age and gender?	14 (19.2%)	59 (80.8%)
3	Were photographs/diagrams provided by the dentist?	4 (5.5%)	69 (94.5%)
4	Was shade selection done by the dentist?	64 (87.7%)	9 (12.3%)
5	Was prosthesis type indicated (All metal/PFM/All ceramic/ Zirconia) by the dentist?	71 (97.3%)	2 (2.7%)
6	Was pontic design indicated?	10 (13.7%)	63 (86.3%)
7	Was margin design mentioned?	27 (37%)	46 (63%)

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8	Was the surface to be covered by metal mentioned?	7 (9.6%)	66 (90.4%)
9	Was occlusal scheme to be incorporated mentioned?	5 (6.8%)	68 (93.2%)
10	Is This an Adequate practice of work authorization?	13 (17.8%)	60 (82.2%)

Figure 1 demonstrates the frequencies of the method of communication adopted by the dental technician.

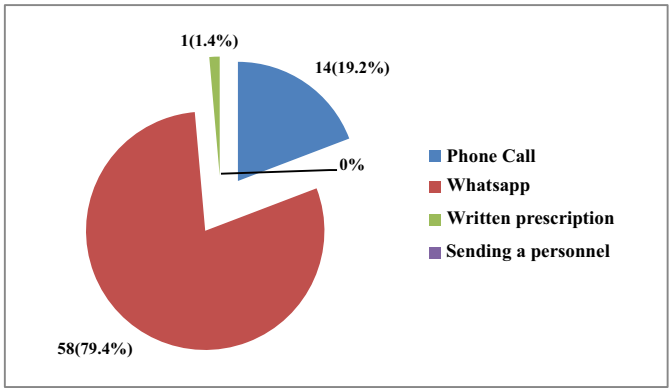

Figure 1: Frequencies of Method of Communication Adopted by the Dental Technician

Table 2 states the association amongst experience of technicians with their qualifications and adequacy of work authorization, respectively.

Table 2: Experience of Dental Technicians Associated with their Qualifications and Adequacy of Work Authorization

Experience of Dental Technicians	Qualification		p-value	Adequate Work Authorization		p-value	Total N (%)
	Achieved N (%)	None N (%)		Yes N (%)	No N (%)		
Less than 5 years	16	17	0.04	5	28	0.59	33
5 years or more	10	30		8	32		40

There was a significant association between the experience of dental technicians and their qualifications; that is technicians with less experience had qualifications rather than the more experienced participants who did not have a BS Dental Technology degree. There was no statistically significant association between the experience of dental technicians and adequate work authorization; that is, work authorization was inadequate in the opinion of both experienced and inexperienced technicians. In addition, it was observed that there was no significant association between experience and method of communication (p=0.54); that is, technicians of both experiences preferred Whatsapp as the favored method of communication with the dentists.

DISCUSSION

Effective communication between dentists and dental technicians is crucial for delivering high-quality prostheses to patients [10, 13]. The lack of communication has been identified as a major factor affecting the provision of optimal dental services [14]. The technician's main information source in the dental clinic is the dentist, highlighting the critical significance that good communication between them has in guaranteeing the caliber of dental prostheses [15]. Because of their different locations, even if they are close by, there are clear communication breakdowns between technicians and dentists when it comes to work authorization forms [16]. When dentists provide incomplete or unclear instructions to dental technologists for fixed prostheses, it ensues in unnecessary additional costs to them [17]. Work authorizations in dental laboratories have been identified as a commonly used yet often misused form of communication between dentists and laboratory technicians [12, 13, and 18]. This was highlighted by this research on dental technicians' perspectives of Lahore. It was found that crucial details on work authorization forms, such as demographic data of the patient, patient photographs, pontic and margin design, and surfaces to be covered using metal and occlusal schemes, were frequently deficient in dentists' submissions. Shetty et al., stated that fewer than 25% of the prescriptions received by dental technicians were clear enough to provide satisfactory service, which is similar to the findings of our study where we recorded 17.8% satisfactory work authorization forms [8]. Similarly, Elsawaay *et al.*, stated that 58% of dentists provided inadequate design to the technicians [19]. In contrast, Azzopardi stated they had a record of 56.2% satisfactory work authorization forms [1]. Dental technicians lack knowledge of basic facts of infection control protocols, according to surveys evaluating their comprehension of the topic [8]. The risk of cross-contamination within the dental clinic increases when the master impression is not adequately disinfected. In our study, 78.1% of impressions received were disinfected by dentists. This is in accordance with Eltawati *et al.*, where technicians received 85.5% disinfected impressions [20]. In our investigation, it was found that 82% of dentists were using alginate to record and send their impressions. This is in contrast to Elsawaay et al., where they stated that alginate for final impression was used in only 4.5% of cases [16]. Alginate is not advised to be used for fixed restorations because of dimensional instability. The dental technician relies on tooth shade information for accurate fabrication. In our study, 87.7% of dentists sent the selected shade for the prosthesis. When shade details were provided, they were often limited to a single tab shade. Similarly, Lone *et al.*, findings revealed that 90% of dental practitioners determined tooth shade using a traditional shade guide [19]. This is contrary to Shetty *et al's.*, finding where they had a response of 74% of dentists who did not provide it [8]. Effective pontic design is crucial for ensuring cleanability, optimal tissue health, and pleasing aesthetics [18]. In our study, only 13.7% of

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technicians confirmed that dentists sent them the pontic design. Similarly, Elsawaay *et al.*, stated in their study that only 19.7% of dentists always sent in the pontic design [16]. Emphasis has been placed on the significance of margin design to uphold oral hygiene and the patient's periodontal health. A poorly designed margin in a fixed prosthesis could promote plaque buildup, increase the risk of cavities, and contribute to periodontal issues. In our study, only 37% of dentists sent details of the margin design to the technician. This was contrary to the findings of Albahbah *et al.*, where they found that 71.5% did send the margin design to the technicians [18]. Several dentists, 93.2%, relied on technicians to accurately place casts in the proper occlusion, neglecting to provide any occlusal information. These outcomes are in contrast to the study of Elsawaay *et al.*, findings, where they had only 38% dentists who did not send in the occlusal scheme to the technician [16]. Many dentists are unaware that inadequate recording of the prepared teeth's occlusal surfaces is what leads to a successful restoration rather than a mistake by the technician. Wagner *et al.*, noted that technicians often resort to contacting dentists by phone for clarification on instructions, highlighting inadequate communication [17]. When faced with poorly filled work authorization forms, technicians prefer contacting dentists via WhatsApp (79.4%) followed by phone calls. No technician sent over personnel to the dentist most likely due to the hassle and added expense of transport for the personnel. WhatsApp offers convenience and instant sharing of pictures and video calls [1, 17]. However, Elsawaay et al., reported the phone (43%) as the most common communication method, followed by written prescriptions (24%) [16]. Verbal instructions may be forgotten; hence technicians prioritize written instructions for medico-legal reasons [1, 18]. It is important to take into account the limitations of this study when evaluating the findings. First of all, the findings were based on dental technicians' self-reported responses, which may introduce recollection bias and cause actual perceptions and behaviors to be over or underestimated. Furthermore, the study's sample was restricted to Lahore, which limits the applicability of the results on an international scale.

CONCLUSIONS

The dental team needs to understand each other's responsibilities to deliver high-quality fixed dental prostheses. Clear communication between dentists and technicians is crucial as currently a meager amount of dentists are fulfilling the forms. Educating dental students and recent graduates on the importance of work authorization is essential. The exercise of filling clear and concise work authorization forms should be included in clinical teachings of final year BDS programs and continuing education courses.

Authors Contribution

Conceptualization: AFB
Methodology: UWJ
Formal analysis: MUDA, AAB
Writing, review and editing: AFB, AQ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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