



Comparative Study of Decontamination Practices in Fixed Prosthodontics

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ABSTRACT

Introduction: The aim of our study was to assess the practical knowledge of dentists and prosthodontists in the city of Casablanca with regard to the decontamination of joint prosthesis work. **Method:** An anonymous questionnaire was distributed and sent online to dentists and prosthetists in private practice. **Results:** 81.1% of dentists use oral prophylaxis prior to surgery. 72% of dentists and 53.3% of dental technicians always disinfect prosthetic devices. Dentists and dental technicians do not respect the recommended disinfection time and method. 67% of dentists use an airtight plastic bag and 47.2% use plastic boxes for packaging. Only 35% of dentists and 40% of dental technicians use a specific room for prosthetic work. 58.1% notified patients at risk. **Conclusion:** dentists are better informed about disinfecting prosthetic work than dental technicians, but both categories do not respect the recommended disinfection time and method for impressions, and do not use a specific room for treating prosthetic work. Dentists and prosthetists need to be trained in decontamination techniques

Keywords: Decontamination -Practical knowledge - Dentists - dental technicians - Dental offices - Prosthetic laboratory.

1. INTRODUCTION:

It has been demonstrated that there is a possibility of cross-contamination between the practice and the laboratory via exchanged elements, notably impressions. These impressions for prosthetic purposes constitute a vector of contamination due to contact with the mucus and serositis of the oral cavity. Infectious diseases (AIDS, tuberculosis, pneumonia, herpes, COVID) have been transmitted from patients to dentists and dental technicians (1). According to a study by POWELL et al, 67% of samples sent to four prosthetics laboratories in the USA were contaminated with bacteria (2). Microorganisms (viruses, bacteria, fungi) are present on impressions. There is evidence that some of these microorganisms are also found on the plaster models cast from the impressions concerned. Moreover, the study by KOHN et al. mentions that some of these microorganisms can persist on plaster models for up to seven days after casting. (3) According to LEUNG and SCHONFELD, castings may contain opportunistic or pathogenic micro-organisms which can be disseminated throughout the laboratory, leading to patient-staff or patient-patient cross-contamination. This contamination will occur if the instruments used in the laboratory are not disinfected between jobs, and if work surfaces are not disinfected. A culture was carried out on plaster from contaminated impressions, showing the growth of microorganisms in media from contaminated impressions, which does not occur in culture from uncontaminated impressions (4). Decontamination is therefore essential.

Various factors need to be taken into consideration during the prosthetic chain: preoperative oral prophylaxis is necessary, and preoperative rinsing with chlorhexidine is the most effective method for reducing the risk of infection. It significantly reduces the bacterial load (5). When it comes to decontaminating impressions, the disinfectant solutions and protocols used must take account of the sensitivity and risk of deformation of the impressions. Universal disinfection methods aim to reduce the pathogen load without damaging impression details. This explains why sterilization is not recommended, as it alters the impression. The antimicrobial efficacy of disinfectant solutions depends on the nature of the active ingredient, the duration of application, the mode of action of the active ingredient and its concentration. Once the impression has been decontaminated, it must be transported to the prosthetic laboratory in accordance with the recommendations in the literature: place the impression in a leakproof plastic bag in a protective box and notify at-risk patients (6). The aim of our study is to assess the practical knowledge of dentists and dental technicians in Casablanca in relation to the decontamination of fixed dental prosthesis works.

2.METHODS:

We conducted a cross-sectional descriptive study in the city of Casablanca using 2 questionnaires, one for dentists and the other for prosthetists. The various questions asked focused on:

- Prophylaxis

- Disinfection of impressions
- Disinfection of prosthetic work
- Treatment site for prosthetic work
- Notification of patients at risk

Our sample consisted of 106 dentists and 30 prosthetists working for private dentists in Casablanca. A pre-survey of 10 people was used to validate the research protocol.

For data collection, questionnaires were distributed directly and sent online to dentists and prosthetists but following the COVID-19 pandemic we added the option of filling in the questionnaire remotely via the Google Forms platform to reduce contact between interviewer and respondent. Data entry and validation were carried out using Excel software.

3.RESULTS:

Through our survey we evaluated the knowledge of dentists and prosthetists in Casablanca:

57.5% of dentists report work on at-risk patients. For the distribution of dentists according to the use of oral prophylaxis, 81.1% of doctors perform oral prophylaxis. The methods used were investigated and summarized in Table 1:

Table 1 - Method used for oral prophylaxis.

	Frequency	Percentage
Water rinse	8	7.5
Chlorhexidine rinse.	35	33
Rinse with Betadine.	13	12.3
Rinse with mouthwash.	44	41.5
Others.	4	3.8

For disinfection of alginate impressions, 50.9% of dentists disinfect for 30 seconds, 26.4% for one minute, and 12.3% for thirty minutes. In prosthetic laboratories, 53.3% of prosthetists disinfect for 30 seconds, 26.7% of prosthetists for one minute, and 20% of prosthetists for ten minutes. The methods used by the two groups are summarized in Tables 2 and 3:

Table 2 - Distribution of dentists according to the method used to disinfect impressions with Alginate

.	Frequency	Percentage
Water rinse	51	48.4
Direct spray disinfection	51	48.4
Direct immersion disinfection	13	12.3
Spray and immersion disinfection	7	6.6

Table 3 - Distribution of dental technicians according to the method used to disinfect impressions with Alginate

	Frequency	Percentage
water rinse	13	33.3
Direct spray	5	16.7
Direct immersion	12	40
spray and immersion	3	10

For elastomer impressions, the methods and duration used are summarized in Tables 4, 5, 6 and 7:

Table 4 - Distribution of dentists according to the method used for disinfecting elastomer impressions

	Frequency	Percentage
water rinse	38	35.8
Direct spray	53	50
Direct immersion	12	11.3
spray and immersion	6	5.7

Table 5 - Distribution of dental technicians dentists according to the method used for disinfecting elastomer impressions

	Frequency	Percentage
water rinse	12	40
Direct spray	5	16.7
direct immersion	11	36.7
Spray and immersion	2	6.7

Table 6 - Distribution of dentists according to disinfection time for elastomer impressions.

	Frequency	Percentage
30 seconds	56	52.8
One minutes	24	22.6
Ten minutes	14	13.2
Thirty minutes	3	2.8
One hour	4	3.8
no answer	5	4.8

Table 7 - Distribution of dental technicians according to disinfection time for elastomer impressions.

	Frequency	Percentage
30 seconds	15	50
One minutes	8	26.7
Ten minutes	6	20
Thirty minutes	1	3.3
One hour	0	0

When it comes to disinfecting prosthetic parts, 72.6% of dentists always disinfect, compared with 53.3% of dental technicians. The means and location used by both groups are summarized in Tables 8,9,10 and 11:

Table 8 - Means of disinfecting prosthetic parts in dental practices.

	Frequency	Percentage
with water	16	15.1
with a product	98	92.5
Sterilization	6	5.7

Table 9 - Means of disinfecting prosthetic parts in dental laboratories

	Frequency	Percentage
with water	11	36.7
with a product	17	56.7
Sterilization	3	10

Table 10: Place of treatment for prosthetic work in dental practices:

	Frequency	Percentage
-You use a specific room	38	35.8
Is the room organized in such a way that the dirty does not come into contact with the clean?	50	47.2
-You mention in the liaison sheet that you have disinfected/sterilized your prosthetic work.	12	11.3
-No answer	6	5.7

Table 11 - Place of treatment for prosthetic work in dental laboratories:

	Frequency	Percentage
You use a specific room	12	40
Is the room organized in such a way that the dirty does not come into contact with the clean?	11	36.7
You mention in the liaison sheet that you have disinfected/sterilized your prosthetic work.	9	30
No answer		

4. DISCUSSION:

4.1. Preoperative oral prophylaxis :

In our study, 81.1% of dentists use oral prophylaxis prior to surgery. Rinsing with mouthwash (41.5%) and rinsing with Chlorhexidine (33.3%) were the two most commonly used methods. A study of 9247 dentists in the Lombardy region of Italy shows that mouthwash rinsing is used by 3.63% of dentists and that 53.73% of dentists rinse with Chlorhexidine 0.12-0.2%. (7) A study carried out by DASGUPTA and all at the Guru Nanak Dental Institute of Science and Research in India on 100 subjects showed that there was a reduction in the number of microorganisms present on the impression if scaling and mouthwash were carried out beforehand, compared with the situation where scaling and mouthwash were not carried out before the impression was taken. And that Chlorhexidine Gluconate is more effective than povidone-iodine against *Staphylococcus Aureus* and *Candida Albicans*. Listérine® (20ml essential oil mouthwash) was the least effective product tested (8).

4.2. Disinfection of impressions:

When it comes to disinfecting impressions with Alginate and elastomers, it appears that dentists and dental technicians do not respect the recommended disinfection time and method. The results of a study in Jordan show that 89.3% of laboratories rinse alginate impressions under running water and 42% do not disinfect them (9). SEDKY and all in Saudi Arabia found that 82.61% of dental technicians disinfected impressions, while 17.39% did not, and that among dental technicians disinfecting alginate impressions, 39.47% adopted rinsing under running water followed by spray disinfection. 71.74% adopt a ten-minute duration. The same team found that 76.09% of prosthetists declare disinfecting elastomers versus 23.91% who do not disinfect. Among the 76.09% of prosthetists disinfecting elastomers, 42.86% rinse under running water and disinfect by immersion (10). THIAM and all conducted a study and found that 100% of dental technicians disinfected impressions with Alginate, only 45% disinfected elastomer impressions, 87% disinfected by immersion, and the majority of dental technicians had no specific time for decontaminating impressions (11). The results of a survey carried out in dental surgeries and laboratories in Bamako showed that 42% used running water rinsing, compared with 25% who used a disinfectant for complete decontamination, and 33% who did both. Disinfection by immersion was the most frequent (87% of cases), with disinfection lasting 5 to 10 minutes in 43.5% of cases (12). GUEYE.M and all from Senegal reported that 60% of dental technicians rinsed alginate impressions with running water; 46.7% of

dentists used a disinfectant for impressions, 66.7% used a disinfectant for decontaminating prosthesis devices (13). L. BAHJE and all in Morocco in 2013 reported that 42.1% of practitioners always disinfected impressions, compared with 8.8% who never disinfected them (14). For impression packaging, 67% of dentists in our study used an airtight plastic bag and 47.2% used plastic boxes. In contrast to a study of dental laboratories in northern India, 96% used plastic bags as a means of packaging (15).

4.3. Disinfection of prosthetic devices:

72% of dentists and 53.3% of dental technicians always disinfect prosthetic devices. Similar results were observed in a study of dental laboratories in northern India, where 59.61% of dental technicians disinfected prosthetic parts. Our results suggest that dentists are better informed about disinfecting prosthetic work than dental technicians (15).

In the literature, it is recommended that the disinfection of various devices (inlay-cores, copings and metal frameworks, inlays, onlays, overlays, crowns, bridges, dental veneers and occlusal splints, wax models and temporary prostheses, etc.) should be carried out by immersion or spraying, while autoclave sterilization is rarely used. Disinfecting plaster models by spraying is not just a matter of washing with water. UV chambers are more effective than chemical disinfection.

4.4. Treatment of prosthetic work:

The right layout helps to ensure compliance with hygiene and asepsis rules, particularly in oral surgery (16). The layout of premises must be determined according to the potential risk of contamination. In our survey, the majority of dentists and dental technicians did not use a specific room for prosthetic work. Half of dentists have organized their rooms in such a way as to ensure that dirt does not come into contact with clean materials. Only 12% of dentists and 28.1% of dental technicians mention in the liaison form that they have disinfected or sterilized prosthetic work. In contrast to our results, a study of dental laboratories in North India shows that 61.53% of dental laboratories have a specific room for receiving impressions (15).

4.5. Notification of at-risk patients:

In our study, 58.1% notified patients at risk. Similar results were found in the study by GUEYE. M and all (53.3%) (17). This explains that dentists are aware of the risk of cross-contamination in their day-to-day practice, particularly when taking impressions, and take steps to avoid it. Communication, preferably must be written (18), between the clinic and the laboratory enables appropriate measures to be taken to avoid cross-contamination. Establishing good communication is then necessary between the dental practice and the laboratory to determine who is responsible for decontaminating transferred items. Laboratory technicians, for their own protection, must disinfect any items received which are not accompanied by a disinfection certificate.

5. CONCLUSION:

Dentists are better informed about the disinfection of prosthetic work than dental technicians, but both categories do not respect the recommended disinfection time and method for impressions, do not use a specific room for the treatment of prosthetic work, and poor communication between the 2 partners was noted. Our study confirmed the need for training in decontamination, during which a protocol containing recommendations must be drawn up, communicated and adhered to.

6. Data Availability:

The data are conserved in the fixed prosthesis department of the Faculty of Dentistry of Casablanca, University Hassan 2 of Casablanca Morocco

7. Conflicts of Interest:

The authors declare that they have no conflicts of interest

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