Original Article

Awareness and Practices of Alginate Disinfection Protocol Among Dental Practitioners of Karachi City

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ABSTRACT:

Objective: To determine the awareness and practices about disinfection of alginate impression among dental practitioners of Karachi city.

Study Design and Setting: This cross-sectional study was conducted at a private sector teaching hospital and private clinics, both located in Hamdard University Dental Hospital, Karachi from the period of April, 2017 to April, 2019.

Methodology: A Questionnaire was designed by subject specialist in light of Australian Dental Association guidelines for cross infection prevention and disinfection for dental offices and laboratory. The questionnaire comprised of demographic details including age, gender, years of clinical experience; awareness of disinfection protocols such as self-protection precautionary measures while pouring the alginate impressions; practices of disinfection in the Laboratory; Practice of personal protection and details regarding the attendance of CDE (Continuing Dental Educations) seminars. The data was analyzed on Statistical Package for Social Sciences SPSS version 20.

Results: Among total subjects of 186, 78(41.9%) male and 108 (58.06%) female participants were included in this study. In present study the awareness of disinfection of alginate was observed in 171(91.8%) subjects while 15(8.2%) were not up to the mark. Regarding precautionary measures n=142 (83.0%) participants used gloves,. Considering the preferred method and duration of disinfection 56.4% used running tap water for gross cleaning of impression for 5 minutes while 43.6% marked spraying with 2% sodium hypochlorite as preferred disinfection method.

Conclusion: majority of the participants of this study were aware regarding the ADA guidelines of disinfecting the alginate impressions while there was a dearth of practice observed for disinfecting the alginate impressions and were not used the prescribed disinfectant to disinfect the dental impressions.

Key Words: Alginate, Chlorhexidine, Disinfection. Dimensional stability, dental impressions.

How to cite this Article:
Anwer S, Omer SA, Mehmood U, Arif H, Mustafa S. Awareness and Practices of Alginate Disinfection Protocol Among Dental Practitioners of Karachi City. J Bahria Uni Med Dental Coll. 2020;10(3):

INTRODUCTION:

Cross infection is defined as 'the transmission of infective agents between patients as well as patients and medical staff within a clinical environment. In dentistry, the control of cross-infection and cross-contamination has been a major concern since dental environment is constantly exposed to these agents[1]. Dental professionals are exposed to wide variety of microorganisms on daily basis and are at greater risk to get infected and become carrier of infections.[2] Even with advancing age there is a little awareness among practitioners and many despite having years of experience do not understand the importance of disinfection[1].

Dental impressions obtained for various purposes are more often contaminated with microorganisms which may originate from saliva, plaque and blood. The survival rate of majority of microorganism is low unlike some pathogens which may survive for longer duration depending on protein availability from fluids outside the body. The harboring of pathogens on impressions can be easily transferred to casts which is poured for the construction of appliance or study purposes and may eventually result in cross infecting the laboratory technicians[3]. Dentists and dental hygienists are therefore at a high risk of exposure to various diseases like Hepatitis B, Hepatitis C, acquired immunodeficiency syndrome, herpes simplex. However, sterilization of dental impressions is not possible.[3,4] Some studies have demonstrated that a numbers of impressions which are sent to the laboratory are contaminated with blood, saliva and food debris.[5]

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Received: 13-Feb-2020
Accepted: 08-Jul-2020

There are many methods of disinfecting the dental impressions; ideally disinfection procedures should be carried out immediately after taking the impressions of patient before sending to laboratories. There are number of reasons for poor compliance in carrying out disinfection of impressions by dental practitioners which may include: time, effort, loss of surface accuracy and dimensional stability of the impression.[6] There were studies carried out in order to assess the post-performance effects of disinfectant on irreversible hydrocolloid (alginate) impressions.[7] Results are greatly influenced on different methods and materials evaluated. Generally, the data obtained is clinically insignificant.[7,8]

Most of the disinfectants are irritant to body and may cause health risks to the dentist and dental auxiliaries. Moreover, these toxic disinfectants are great source of corrosion for metallic impression trays resulting in dislodgement of the impression from corroded parts of tray.[9,10] General standard operating procedures for cleaning and disinfection include thorough rinsing of impression under running tap water; it removes food debris and saliva. After rinsing, immersion and spraying under disinfectants is a routine recommendation for impressions. Spraying requires less solution, time and can be used for disinfecting chair side surfaces. As dentist is bound to take proper protective measures such as gloves, mask, eyewear and clinical clothing while carrying out chair side dental procedures (e.g. dental checkup, fillings) same protocol should be followed when disinfecting the impressions. All hospital and clinic staff must be trained by professionals to perform infection prevention protocols independently and dental offices must be in compliance with the Occupational Safety Health Administration (OSHA) guidelines.[11]The dental impressions that are exposed to patient's saliva or blood, contaminated the stone casts and serve as a source of infection to dental personnel who handle or deal with the impressions or casts.[12]

Safety for dentists and general population can be emphasized through conduction of awareness and appraising the reasons for poor compliance can result in acquiring large number of serious health conditions. Despite of enough studies conducted and papers being published on awareness of disinfection of impression already but still there is a gap in determining the role of various disinfection procedures over dimensional accuracy and surface standard of impressions. A local study conducted in Karachi city revealed that one third of dental practitioners had sufficient knowledge regarding disinfection of dental impressions.[13] Another study conducted by Saad and colleagues concluded that 93.6% of study group was aware of appropriate need of disposal of disposable impression trays however method of disposal were different. According to another study; 100% study group was sending the impression out after washing or disinfecting them which were an incredible finding.[14]

The aim of this study was to determine the awareness and practices about disinfection of alginate impression among dental practitioners of Karachi city.

METHODOLOGY:

This cross-sectional study was conducted at a private sector teaching hospital and private clinics, both located in Hamdard University Dental Hospital, Karachi from the period of April, 2017 to April, 2019.The Department of Research and innovation of Hamdard University Dental Hospital issued the ethical approval letter with ERC number 112-09-03-17 approving the conduct of study. Sample size was calculated from the online software openepi.com. The statistical conditions were 95% confidence interval and 5% margin of error. Prevalence of disinfection of alginate impression material was used as 62%.[13]Therefore the calculated sample size was 362.

For this study the non-probability convenient sampling technique was utilized. A Questionnaire was designed by subject specialist in light of Australian Dental Association guidelines for cross infection prevention and disinfection for dental offices and laboratory. The Australian Dental Association (ADA) recommends the following disinfectants: 0.5% Chlorhexidine, 1% Sodium hypochlorite, 2% Glutaraldehyde and Iodine agents. The 1% Sodium hypochlorite has been generally accepted as the disinfecting agent of choice for alginate.[15] Furthermore, the American Dental Association guidelines states that impression should be rinsed to remove saliva, blood and debris and then disinfect before being sent to the laboratory personals.

The questionnaire comprised of demographic details including age, gender, years of clinical experience; awareness of disinfection protocols such as self-protection precautionary measures while pouring the alginate impressions; practices of disinfection in the Laboratory; Practice of personal protection and details regarding the attendance of CDE (Continuing Dental Educations) seminars. The responses were closed ended as yes or no for the awareness, practice of personal protection and details regarding the attendance of CDE questions. Validity of questionnaire was assessed by Cronbach's alpha test. It was found to be 0.8 (acceptable). All the dentists working in private clinics and teaching hospital at Hamdard University Dental Hospital, Karachi were approached for the study. A total number of 362 questionnaires were distributed among dental professionals, out of which 186 responded were completed in all aspects and therefore were included in the study. All participants were briefed about the rationale of the study and written informed consent was obtained from all the participants before data collection. All data were transferred on Statistical Package for Social Sciences SPSS version 20. Descriptive statistics was applied for qualitative variables.

RESULTS:

The response rate was 51.38% as total 262 forms were distributed from which 186 were completed in all sections

and were included in the study. Among total subjects of 186, 78(41.9%) male and 108 (58.06%) female participants were included in this study. In present study the awareness of disinfection of alginate was observed in 171(91.8%) subjects while 15(8.2%) were not up to the mark according to disinfection protocols as shown in Table 1.We further investigated precautionary measures while pouring the dental impression which is an important protocol to prevent cross infection among dentists and laboratory technicians. The present findings revealed that 142 (83.0%) participants used gloves, 7(4.0%), face mask and 22 (12.8%) wore goggles as medium for protection during impression taking procedures.

In present study investigation regarding type of disinfection materials was also investigated. Considering the preferred method and duration of disinfection 56.4% used running tap water for gross cleaning of impression for 5 minutes while 43.6% marked spraying with 2% sodium hypochlorite as preferred disinfection method.

Males were found to be more compliant (52.8%) than females (37.2%) with the disinfectant protocols of alginate impression. The alginate disinfection compliance were also observed among specialists and general practitioners were 13(59.1%) and 57(51.4%) respectively which was greater than assistants and hygienists 7(28.0%) and 9(32.1%) respectively (See Figure1). The participants were also asked about the continuing dental education programs (CDE), 54.3% of participants did not attend any type of CDE programs, while rest 45.7% responded that attending CDE program has improved their clinical practice.

DISCUSSION:

This study was aimed to determine the awareness and practices about disinfection of alginate impression among dental practitioners of Karachi city. Clinical dentistry deals with majority of procedures which may cause cross infection. Dental impressions contaminated with patient's saliva and blood may cross infections. Contaminated impressions and dental casts, thus become tools for the transmission of both

Figure 1: Alginate dininfection compliance according to Designation

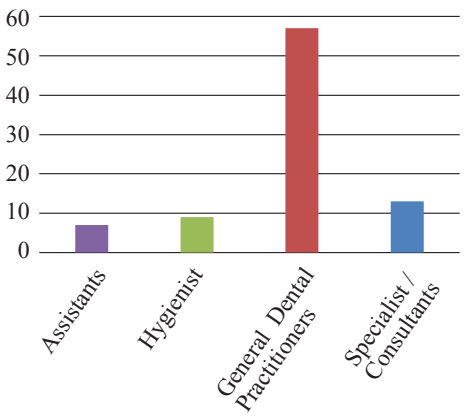

Table 1. Awareness of Alginate Disinfection (n = 186)

Awareness of Disinfection	n (%)
Yes	171(91.8%)
No	15(8.2%)
Practice of Precautionary (protective) measures while disinfecting the impression	
Gloves	142(83.0%)
Masks	7(4.0%)
Goggles	22(12.8%)

bacteria and viruses between clinics and dental laboratories.[16,17]

When considering disinfection method of dental impression in the current study the majority of the respondents were aware of method of alginate disinfection. Whereas another study conducted in Karachi city demonstrated the maximum numbers of subjects were unaware about the appropriate method of disinfection.[11]

Al Mortadi and colleagues conducted a study revealed that the most of laboratory owners (53%) believed that the dentist should disinfect the impressions before sending them to dental laboratories, while (45%) believed that disinfecting the impressions is the responsibility of the dental assistant. Moreover, about 38% of this study population reported not using gloves in their labs.[18]

A local study conducted by Amin F in different dental college showed that the one third of practitioners have practiced impression scrubbing after taking impression.[11] Present study findings also support the other studies such as Shah et al, conducted a study on cross infection control within UK orthodontics departments in which they found that the majority of departments had policy in place to decontaminate impressions and at the dental office.[19]

The cross-infection control has a prime importance in clinical dental practice but impression disinfection is still a widely neglected area, the proper criteria for impression disinfection includes: 1) spray or immersion (the most suitable method), Appropriate application (time of contact) and Periodic check for efficacy.[15]

Awareness of various methods of disinfecting the dental impression was also investigated in current study. The present study findings showed the majority of our participations washed impression under running tape water for gross cleaning of debris. A study conducted in a tertiary care hospital in Lagos Nigeria revealed the spraying 49(21.8%), immersion 89(39.5%) methods used by their subjects for alginate disinfection.[20]A local study conducted in Lahore, Pakistan reported that House officers and students had knowledge of infection control and were following the internationally acceptable standard procedures for dental impression disinfection.[14] However, a large number of

dentists in Karachi Hospital in a different study where described as having a poor knowledge about the use of disinfecting agents.[11]

Bacterial species like Streptococcus, Escherichia coli, Staphylococcus, Actinomyces, Pseudomonas, Klebsiella, and Candida are commonly seen in the oral cavity. Impression materials are commonly contaminated with such microorganisms. Choudhury GK, conducted study to assess the disinfection efficacy of Epimax and 0.525% sodium hypochlorite on alginate impression over a period of 10 minutes was found that both Epimax and 0.525% sodium hypochlorite can disinfect the alginate impression material against P. aeruginosa, C. albicans, and S. aureus strains. However, Epimax was found to be more effective against S. aureus as compared with 0.525% sodium hypochlorite.[21]

In most countries this is now being in practice to attend containing dental education for up gradation of knowledge about the subjects. Achieving good dental practice requires health care professionals to keep their scientific knowledge and skills up to date throughout their work as well as to maintain and improve their clinical performance and attitude. A cross-sectional study conducted in Eastern Province in Saudi Arabian dentists reported that about 67.3%of dentists attended CDE for personal learning needsand 66.9% for career development.[22]In this context our majority of subjects did not attend the continuing dental education workshops or seminars.in our opinion the attending the CDE courses will help to improve the confidence in delivery of professional services.[23] Therefore, dental colleges and dental education providers should highlight the importance of disinfection of impressions and also incorporate the impression disinfection protocols in their curriculum for students and dental auxiliaries. Furthermore, CDE Programs to increase awareness and reduction of risk of cross infection should be conducted frequently because practicing safe dentistry is only the road to prosperity of dentistry in Pakistan.

CONCLUSIONS:

This study concluded that majority of the participants of this study were aware regarding the DA guidelines of disinfecting the alginate impressions while there was a dearth of practice observed for disinfecting the alginate impressions and were not used the prescribed disinfectant to disinfect the dental impressions but and were only using the washing under tap water as to remove debris from impression which is inadequate for inhibiting a microbial growth.

Author Contribution:
Safia Anwer: Literature Search / Review
Syed Ahmed Omer: Study conception and design
Perveen Memon: Literature Search / Review
Usman Mehmood: Statistical analysis
Hameedullah Arif: Critical Revision
Shahid Mustafa: Analysis and interpretation

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