International Invention of Scientific Journal
Online ISSN: 2457-0958
Available Online at http://www.iisj.in Volume 7, Issue 03(July-August-September)|2023|Page: 78-88
Original Research Paper-Medical Sciences

Awareness Level of Cross-Contamination Control & Practice among Dental Laboratory Technicians in Aljabal Alakhdar Region, Libya

Corresponding Author:
Dr. Shoaib Youssef Albahbah
Department of Fixed Prosthodontics, Faculty of Dentistry, Omer-Almukthar University, Libya.

Article Received: 20-May-2023 Revised: 10-June-2023 Accepted: 30-June-2023

ABSTRACT:

Aim & objectives: In dental offices, infection prevention is crucial. There is ample evidence of possible disease transmission in the dentistry lab. Dental technicians should properly follow the recommended safety measures to reduce the danger of cross-contamination and create a secure environment for both patients and employees. The purpose of this study was to assess dental lab technicians' knowledge, attitudes, and behavior about infection control procedures in the dental labs in the Aljabal Alakhdar region of Libya. **Setting & design:** Dental technicians were surveyed using a self-assessment questionnaire to determine their level of familiarity with and proficiency with infection control procedures in dental labs. **Materials and methods:** In the Aljabal Alakhdar region of Libya, 21 dental laboratory technicians who worked for both private and public laboratories were given a self-administered questionnaire containing a number of questions about their knowledge of infection control practices. Data was gathered and examined. **Results:** The response showed that 57.2% of dental technicians receive 30–50 or more than 50 impressions in a week. About 80.9% of the technicians used a plastic bag to carry impressions. Forty-two percent of the dental technicians were aware of infection control protocol. Seventy-six percent of the technicians received impressions while wearing gloves and 90.4% of the dental laboratories had a separate receiving area. Nearly 57.1% of the technicians communicate with the doctor regarding the disinfection of impression received in the laboratory. Almost 23.9% of the dental technicians disinfect all the impressions and 90.4% technicians use immersion for disinfection of impressions. Only 28.5% responded that they immerse impressions for 10 min for disinfection. About 71.5% use gloves, 66.6% use mouth masks, 80.9% wear eye shields, and 38% wear aprons while working. Nearly 80.9% of the technicians received vaccination against hepatitis B virus. Almost 90.4% of the technicians change pumice slurry after regular intervals, and 76,1% do not add any disinfectant. Nearly 61.9% of technicians disinfect the prostheses before sending it to the clinic, and 90.4% disinfect them by immersion technique. About disposal of waste, 90.4% said that they dispose the waste properly. **Conclusion:** Different levels of knowledge, attitude, and infection control practice were shown by the responders. Dental treatments are more susceptible to infection and cross-contamination than other medical procedures, and infection control guidelines and policies are poorly understood and poorly followed. To avoid the spread of infection and to raise the degree of safety during oral health treatment, educational interventions must be made to boost the awareness and understanding of dental technicians.

Key words: Cross-contamination, dental laboratories, dental technicians, disinfection, infection control .

INTRODUCTION

In the dental office, infection management is a crucial concern. According to reports, an average healthy person's mouth produces roughly 750 million bacteria in 1 ml of saliva. As a result, it is one of the most frequently discussed issues in dentistry and has become such a crucial component of daily work that dental professionals no longer dispute its importance.[1] Dentistry is primarily a surgical discipline that involves exposure to saliva, blood, and other potentially infectious materials. As a result, it demands a high standard of infection control and safety in order to prevent cross-contamination and work-related exposure to diseases that are spread through saliva and blood. When treating patients, dental practitioners are more likely to contract other infections. The dental laboratories are frequently disregarded, in contrast to the surgical operating rooms and dental treatment rooms where infection control precautions are strictly advised. This poses a risk to dental technicians' health since they could come into contact with pathogenic bacteria through contaminated prosthetics, impressions, and/or

poor handling of clinical materials after they arrive at the dental laboratory. Due to their close contact with the patient's mouth, saliva, and possibly blood, these materials are the main means by which an infection spreads from the patient to the dental technician. According to research, dental professionals have a 5–10-fold higher risk of contracting hepatitis B than the general population.[2] The Centers for Disease Control and Prevention (CDC) created general precautions in 1987 to assist shield patients and health care workers (HCWs) from contracting blood-borne diseases in medical facilities. The American Dental Association (ADA) also published guidelines for disinfection in 1988, 1991, and 1996 to address the cross-contamination concerns. Although various regulations have been established and updated from time to time, it is regrettable that many dental laboratories still practice subpar cleanliness, which points to the necessity for more control methods. It is crucial to assess dental technicians' understanding of personal hygiene and protection, as well as their drive to put that information into practice. The main issue in dental laboratories these days is infection control due to the perceived risk of infection among staff members and patients. There is a chance of contamination from the prosthetic items leaving the dentist office, even if the dental professionals do not have direct contact with the patient's mouth cavity. Regarding the perceived risk that dentists and patients are exposed to, infection prevention in dentistry is a major concern. In the past ten years, dentistry has made significant strides in infection prevention, especially in light of the advancements made in medicine overall in the twenty-first century.[1] However, the manipulation of particular materials between the dental office and the dental laboratory during prosthodontic treatments still presents a number of potential for cross-contamination. Effective methods for the sterilization and disinfection of dental impressions, prostheses, appliances, and a range of other objects are now available as new products and processes, posing a serious infection control problem.

Effective coordination and communication between the dental office and the dental laboratory should reduce the risk of infection for both patients and healthcare professionals, while also preventing damage to prosthetic materials from excessive disinfectant exposure and the needless use of particular infection control protocols.

Both at the dental office and the dental laboratory, it is crucial to implement Universal Precautions, which calls for the use of protective gear, particular hand hygiene procedures, the disinfection of devices, equipment, and surfaces, as well as the sterilization of reusable tools. [3] Even though there are some recommendations in this area, there are no strict legal requirements or national standards for the handling of prosthetic items between dental laboratories and dental offices, and there aren't many studies that assess how well dental technicians adhere to preventive measures to stop the spread of infection. The purpose of the study was to assess the knowledge of and attitudes toward infection prevention among dental lab technicians in the Aljabal Alakhdar region.

MATERIALS & METHODS:

All health care professions place a high value on infection control, which is still one of the most economically advantageous interventions. According to the British Dental Association, "infection control is a core element of dental practice"[3]. These recommendations are applicable to all dental specialties and levels for anyone directly or indirectly involved in the delivery of dental care, including dentists, dental assistants, dental nurses, dental technicians, and dental students.[4]

A cross-sectional study was conducted (after obtaining informed consent from technicians before the commencement of survey) to obtain information regarding the awareness toward the infection control in the dental laboratories in Aljabal Alakhdar region.

Data were gathered(during August 2023) from dental laboratory technicians in response to a questionnaire developed by the author . A total of 21 dental technicians were participated in the questionnaire that was distributed among the dental laboratories in Aljabal Alakhdar region.

A self-administered survey with 20 questions had been created. In addition to answering questions about their knowledge and use of infection control measures, such as using gloves, protective eyewear, and face shields, getting vaccinated against the hepatitis B virus (HBV), and regularly changing pot water or pumice slurry, respondents were also asked to provide demographic information about their age and gender. The survey instrument had been put through a questionnaire pilot study, and the results were reviewed to see whether the questions were relevant and clear. Adaptations were made in response to participant comments during the pilot test. The response rate was of 70%. The questionnaire included 20 questions that covered three major sections. The first section included demographic data (age, gender,& professional years of experience) . The second section was about the laboratory information. While the third section of the questionnaire covered the knowledge assessment, practice, & attitude toward infection control procedures of the respondents toward infection control procedures. The questionnaire was considered as valid if all the questions were

answered. The results were processed using the SPSS 14 system and Chi-Square test. ($p < 0.05$)

Fig. 1: Questionnaire for response to infection control .

1. How many impressions does your laboratory receive in a week ?

a) < 20 .
b) 20-30 .
c) 30-50 .
d) < 50 .

2. How does laboratory attendant carry impressions from dental clinic to the laboratory?

a) Plastic bag .
b) Container .
c) Others .

3. Are you aware about the various infection control measures to be taken into practice ?

a) Yes .
b) No .

4. How do you receive impression or prosthesis in the laboratory ?

a) Bare hands .
b) Gloves .
c) Others .

5. Does your laboratory have a separate receiving area (Do you have a specific area in your dental laboratory that is meant for disinfection only?

a) Yes .
b) No .

6. Is there any communication between you & the dentist regarding the disinfection of impression/ prosthesis received in the laboratory ?

a) Yes .
b) No .

7. Do you disinfect the impressions received in the laboratory ?

a) All .
b) Few .
c) None .

8. If you disinfect the impressions then what is the mode of disinfection of the impressions ?

a) Immersion .
b) Spraying .
c) Others .

9. If immersion is the method used for disinfection then duration of time employed for the same is ?

a) < 10 minutes.
b) 10 minutes.
c) > 10 minutes .

10. Do you wear any of the protective wares while working in the laboratory ?

a) Gloves
i. Yes .
ii. No .
b) Face mask
i. Yes .
ii. No .
c) Protective eye shield
i. Yes .
ii. No .
d) Apron
i. Yes .
ii. No .

11. Have you received vaccination against hepatitis B virus ?

a) Yes .
b) No .

12. Do you change pumice slurry after regular intervals ?

a) Yes .
b) No .

13. Do you add any disinfectant to the pumice slurry ?

a) Yes .
b) No .

14. Do you disinfect the prosthesis/denture before sending it to the clinic ?

a) Yes .
b) No .

15. What mode do you employ for disinfecting the prosthesis/denture in the laboratory?

a) Immersion .
b) Spraying .
c) Others .

16. Do you use proper disposal system for waste in the laboratory ?

a) Yes.
b) No.

17. Have you received infection control training courses ?

a) Yes.
b) No.

18. Have you reported sharp injuries to laboratory administration ?

a) Yes.
b) No.

19. How often do you clean and disinfect your dental laboratory (the frequencies of cleaning & disinfection of dental laboratory) ?

a) Daily.
b) Twice a week.
c) Weekly.
d) Monthly.

20. Have you an infection control manual display in the dental lab (have you a written protocol for disinfection) ?

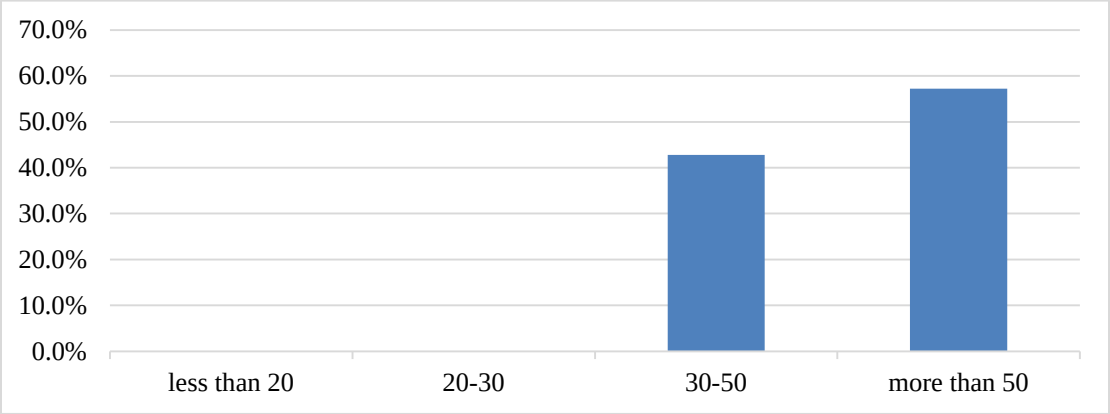
a) Yes.
b) No.

RESULTS:

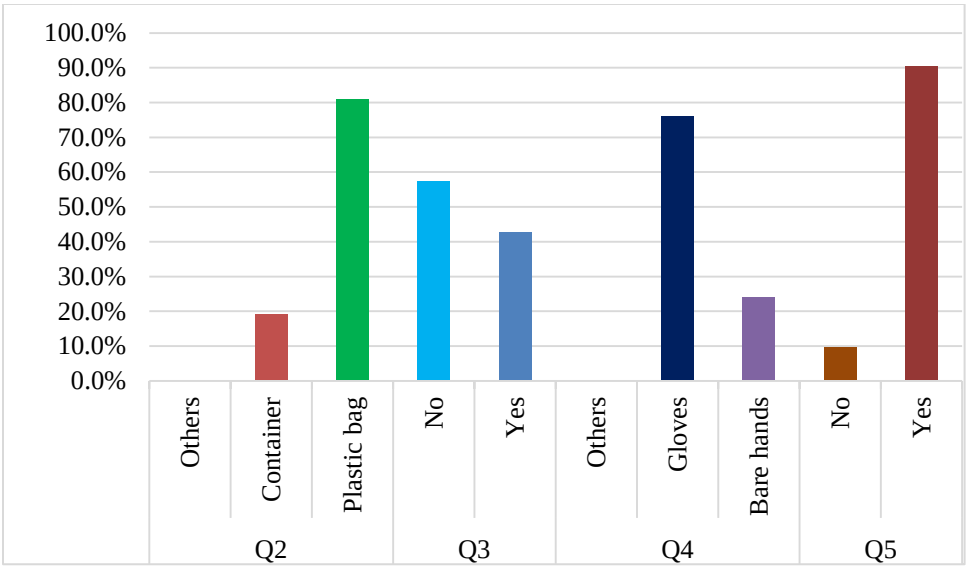
Out of 30 dental technicians contacted, 21 responded to the survey . The operatory area was properly ventilated and adequate water drainage in the laboratories. The obtained data were analyzed, and results have been presented with graphical presentation for ease of understanding. The response rate among dental technicians was 70% . Of the total respondents, 19 were males (90.4%) and 2 were females (9.6%) . The major age group of participants was (21-45 years) who work in a private dental laboratory with less than 15 years of experience. The response showed that most of the dental technicians receive 30–50 (42.8%) or more than 50 impressions (57.2%) in a week [Graph 1]. Most of the laboratory attendants carry impressions in plastic bag (80.9%) to the laboratory [Graph 2]. Only 42.8% of the dental technicians said that they are aware of infection control protocol [Graph 2]. Seventy-six percent of the technicians told that they receive impressions while wearing gloves [Graph 2]. About 90.4% of the dental laboratories had a separate receiving area in the laboratories [Graph 2]. Nearly 57.1% of the technicians said that they communicate with the doctor regarding the disinfection of impression/prosthesis received in the laboratory [Graph 3]. 23.9% of the dental technicians responded that they disinfect all the impressions. Immersion was the method used for disinfection of impressions by most of the technicians (90.4%) [Graph 3]. Some of them (28.5%) responded that they immerse impressions for 10 min for disinfection [Graph 3]. Regarding protective wears 71.5% said that they use gloves, 66.6% said that they use mouth masks, 80.9% told that they wear eye shields, and 38% said that they wear aprons while working [Graph 4]. Most of the technicians received vaccination against hepatitis B virus (HBV) (80.9%) [Graph 5]. Majority of the technicians (90.4%) stated that they change pumice slurry after regular intervals and 76.1% said that they do not add any disinfectant [Graph 5]. About 61.9% of technicians said that they disinfect the prosthesis/denture before sending it to the clinic [Graph 5]. Most of them (90.4%) disinfect them by immersion technique [Graph 6]. About disposal of waste, 90.4% said that they dispose the waste properly [Graph 6].

Table 1. Demographic characteristics of participating dental laboratory technicians (N = 21).

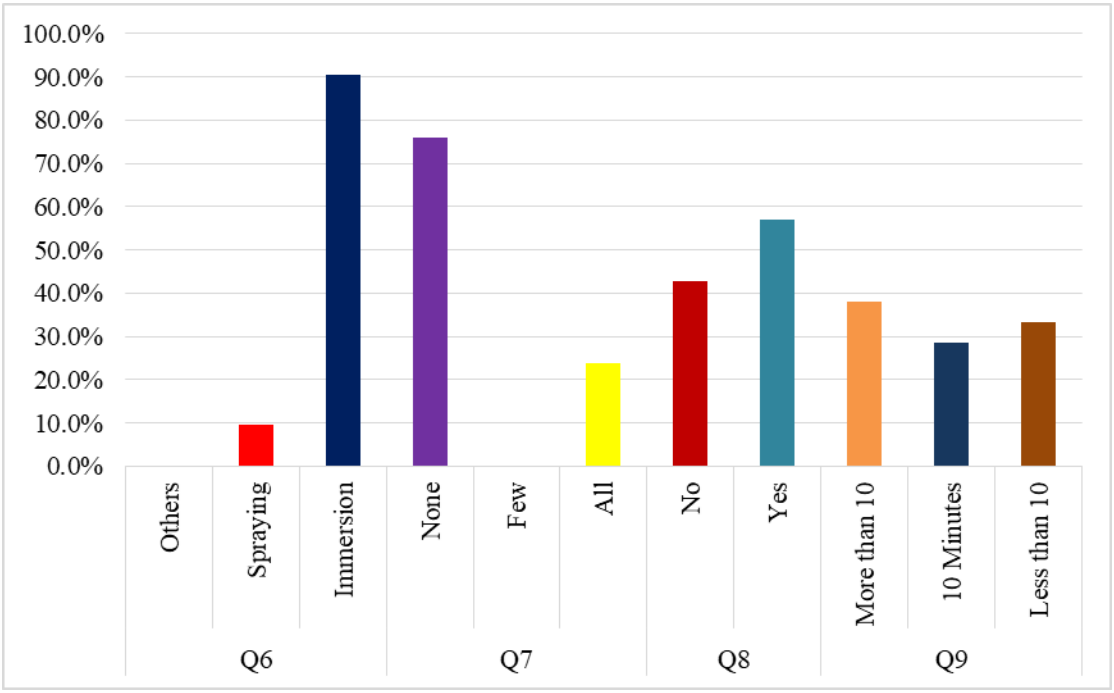
Demographics		N %
Gender	Male	19 (90.4%)
	Female	2 (9.6%)
Age	21-45 years .	
Years of experience	Less than 15 years .	



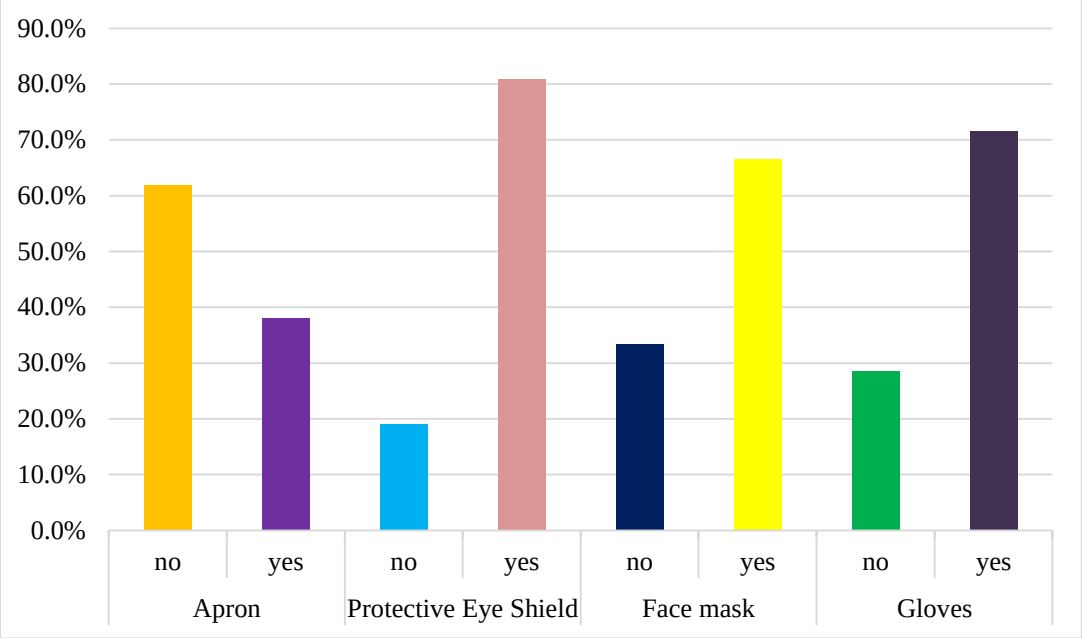
Graph 1: Response to the Question 1: How many impressions does your laboratory receive in a week?



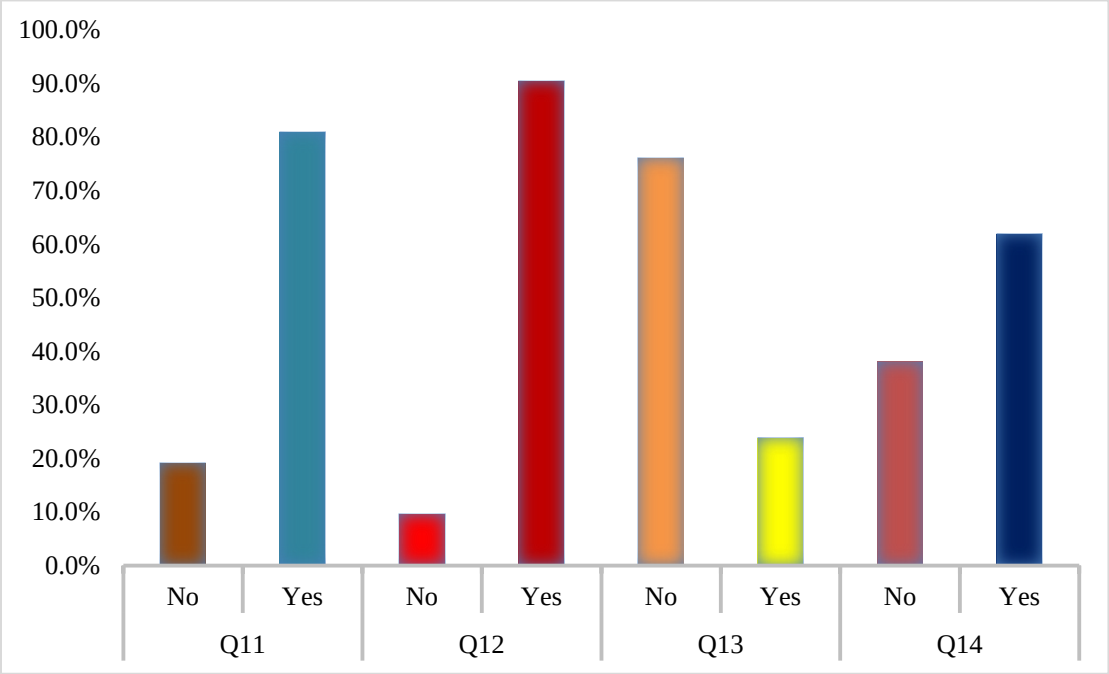
Graph 2: Response to Question 2: How does laboratory attendant carry impressions from dental clinic to the laboratory? Question 3: Are you aware about the various infection control measures to be taken into practice? Question 4: How do you receive impression or prosthesis in the laboratory? Question 5: Does your laboratory have a separate receiving area?



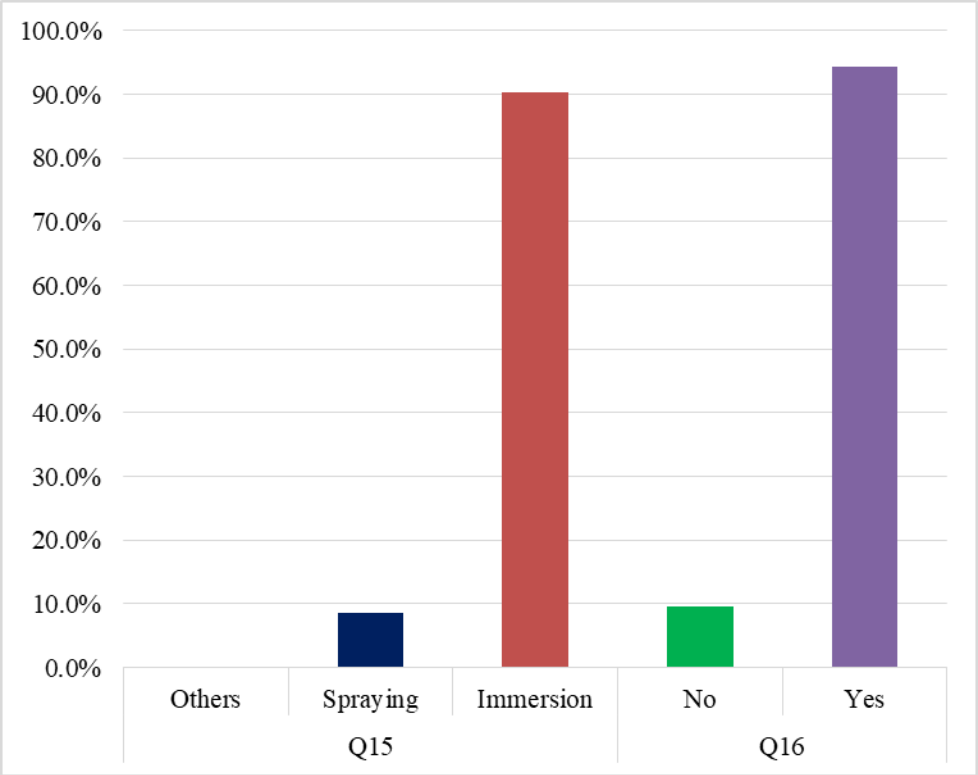
Graph 3: Response to Question 6: Is there any communication between you and the dentist regarding the disinfection of impression/prosthesis received in the laboratory? Question 7: Do you disinfect the impressions received in the laboratory? Question 8: If you disinfect the impressions then what is the mode of disinfection of the impressions? Question 9: If immersion is the method used for disinfection then the duration of time employed for the same is?



Graph 4: Response to Question 10: Regarding the use of protective wares while working in the laboratory?



Graph 5: Response to Question 11: Have you received vaccination against hepatitis B virus? Question 12: Do you change pumice slurry after regular intervals? Question 13: Do you add any disinfectant to the pumice slurry? Question 14: Do you disinfect the prosthesis/denture before sending it to the clinic?



Graph 6: Response to Question 15: What mode do you employ for disinfecting the prosthesis/denture in the laboratory? Question 16: Do you use proper disposal system for waste in the laboratory?

DISCUSSION:

Between the dental laboratory and the dental clinic, things that could be contaminated with pathogenic bacteria are transferred in fixed prosthodontics. Many of the bacteria, fungi, and viruses that are found in the prosthodontic environment have been connected to crippling and fatal illnesses. Dental technicians may become infected at a dental laboratory, mostly via contaminated impressions brought in from dental offices [16,17]. On the other hand, infected materials delivered from dental laboratories to dental clinics may cause cross infection among dental workers and patients. [18] The reduction of potential hazards of disease propagation is only realistic, despite the aims being directed toward disease prevention.[17] According to a review of the literature, 15.4% of dental technicians report having an occupational danger.[18]

Dental casts are more difficult to clean than imprints because bacteria permeate these casts' interiors, making the task challenging. Even in set gypsum, oral bacteria can survive for up to a week. Therefore, it is necessary to sterilize all impressions from the dental surgery [6]. From their medical histories, physical examinations, or easily accessible laboratory tests, not all infected patients may be identified. The Centers for Disease Control (CDC) have therefore proposed "universal precautions". This means that all human blood and saliva should be handled with the same care as if they were known to be contaminated with the hepatitis B virus (HBV), the human immunodeficiency virus (HIV), and other blood-borne infections [20,21].

In this study, observation of various infection control measures in dental laboratories of Aljabal Alakhdar region has been done. On enquiring on the method of carrying an impression from the clinics to the laboratory by the attendant, 80.9% of the dental technicians told that they received impressions in plastic bags while 19.1% said that they received it in a container. The Occupational Safety and Health Administration (OSHA) has given specifications for handling and transporting specimens of blood contaminated or other potentially infectious materials. Potentially contagious goods must, according to it, be put in a container that doesn't leak. Such specimens/containers must be labeled or color-coded before leaving the dental laboratory.

Regarding awareness about the various infection control measures to be taken into practice, only 42.8% of technicians said that they were aware of it. Al-Kheraif and Mobarak[6] did a survey on infection control practice in private dental laboratories in Riyadh and found that 87.5% of the respondents were unaware and did not follow any infection control procedure. They recommended that formal infection control training should be required for dental technicians in dental

institutes, either as a requirement for hiring or as part of the training process. Additionally, they must to be inspired to adhere to a unified set of accepted safety measures, treating each patient as a potential source of infection.

Approximately 76.1% of dental technicians said they take impressions while donning gloves. According to Bhat et al. [7], the barrier system must be adhered to consistently in the lab. Use only disposable gloves at all times. After each use, the gloves should be properly disposed away. Both before and after removing the gloves, wash your hands. Cleaning laboratory lab jackets, face masks, safety eyewear, and disposable gloves are all recommended for technicians working in the disinfection area [22].

When asked whether their laboratories have separate reception spaces for impressions and prostheses, 90.4% of dental technicians said they did. 9.6% of the respondents had no disinfection areas, whereas a significant portion of the respondents (9.6%) relied entirely on the dental clinics for all disinfections. This finding can be the result of improper handling instructions for dental impressions and specimens. The dental plaster rooms were used for the dental laboratories that performed disinfection even though they lacked dedicated disinfection sections. Because it may create cross-infection between freshly obtained impressions and the cleaned ones, this is seen as a significant concern.

57.1% of dental technicians responded that they contact with doctors when asked if they do so regarding the sterilization of impressions and prostheses that were received in the laboratory. There should be adequate communication between the dental laboratory and the dentist regarding the decontamination of items that have been shipped (must have a label stating whether it was disinfected and with what disinfectant), according to Kohli and Puttaiah[4] in their book on infection control in dentistry.

About the disinfection of the impressions received in the laboratory, only 23.9% of dental technicians responded that they disinfect all the impressions they receive from clinics. The findings indicated that personnel are not dedicated to disinfecting imprints. According to Marya et al. [9], if an impression is not cleaned and disinfected, the entire laboratory environment may become contaminated, allowing bacteria to go back and forth from the laboratory to the clinical area. To ensure their own immunity against infection, the laboratory workers must therefore thoroughly disinfect all of the imprints.

Dental technicians were asked which technique they preferred for sanitizing impressions, and 90.4% said immersion, while 9.6% said spraying. The immersion method is preferable over spraying, according to Ngpal and Chaudhary[10] and Kaul et al.[8], since it ensures consistent contact of the disinfectant with all surfaces of the impression. They advised either spraying or submerging a suitable disinfectant in water to clean all of the impressions.

Nearly 28.5% of dental technicians said they submerge impressions in a disinfectant for 10 minutes, 33.3% said they do it for less than 10 minutes, and 38.2% said they do so for longer than 10 minutes. The findings showed that technicians were not adhering to any established standards for disinfecting imprints and were unaware of the real time period for which disinfection must be performed. According to Kugel et al.[11], the majority of dentists and laboratories disinfect impressions for longer than is advised. The best amount of time to clean the impression was 10 minutes. The ADA advised using an ADA-accepted disinfectant that can be cleaned in less than 30 minutes.

In response to the question of whether dental technicians wear gloves or mouth masks as personal protection equipment (PPE) when working in the laboratory, 71.5% of dental technicians indicated that they do. Additionally, 38% of dental assistants said that they use aprons, and 80.9% said that they wear eye protection while working in the lab. It may be inferred from this that dental assistants were aware of PPE. Face masks, for instance, guard against breathing in aerosols with particle sizes as small as 50 microns. Additionally, using lab coats and gloves is crucial since they reduce the risk of cross-contamination.

Gloves, surgical masks, protective eyewear, face shields, and protective clothing are among the primary PPE (protective eyewear and face shields) utilized in oral health-care settings. Before dental health care providers leave the patient care area, all PPEs should be taken off. When clearly soiled, reusable PPE should be washed with soap and water in accordance with the manufacturer's instructions. OSHA required the use of gloves, surgical masks, protective glasses, and protective garments to lessen the risk of exposure to saliva/blood-borne diseases in specific situations.[12]

The dental laboratory must be as free from infection as feasible. This can be accomplished by reducing the risk of disease transmission through: Immunization: Hepatitis B virus vaccination is a requirement for all dental technicians.

Barrier techniques entail using an alcohol-based hand rub or antimicrobial soap to wash hands before entering a dental laboratory. After getting rid of used gloves, the same process must be done to prepare for new gloves. A dental technician should always use personal protection equipment, such as gloves, masks, goggles, and lab coats, while working in the dental laboratory [21]. Since utility gloves are thicker and more durable than

disposable gloves, they should be used for cleaning or disinfecting surfaces or equipment. When operating polishing lathes, model trimmers, motors, or any other rotary equipment, or when there is a chance of splashes, spray, splatter, or aerosols, masks, protective glasses, or clothes must be worn. Laboratory lab coats should never be worn outside of the lab while fabrication is taking place within. They should also be replaced or laundered every day. This stops pollutants from being transferred from one lab to another. When asked if they have obtained the HBV immunization, 80.9% of dental technicians responded in the affirmative. For infection prevention and personal safety, the HBV vaccination is crucial. Almost all research on infection control recommended immunizing the dentist and his staff, including the technicians. The Centers for Disease Control and Prevention[13] released a report in 1987. created general safety measures to aid in preventing patients and HCWs from contracting blood-borne infections in healthcare environments. In their line of work, dental technicians come into touch with a number of dangerous elements that raise the possibility of infection and cross-contamination. All laboratory staff who have not had antibody testing revealing immunity or who have not previously received a vaccination should receive hepatitis B virus immunization, per the Guidelines for Developing a Dental Laboratory Infection-Control Protocol published by the International Journal of Prosthodontics in 1992 [24]. All laboratory workers who have not already received the hepatitis B virus vaccine or who have not had antibody testing show immunity should do so.

In terms of changing the pumice slurry after regular intervals, 90.4% of dental technicians reported doing so in their dental laboratories. Pumice solution should be created by suspending the pumice in a tincture of green soap or another surfactant and mixing with an efficient disinfection solution, according to the US Army Dental Care System[14]. After each case is finished, the pumice needs to be replaced. The pumice and rag wheels should at the very least be cleaned every day. Regular cleaning and disinfection of the equipment is required.

Only 23.8% of dental technicians claimed they apply disinfection to the pumice slurry, despite the fact that the practice is common. Given the wide range of bacteria seen in patient saliva and blood, Firoozeh et al.'s[15] study suggested that dental laboratory staff might be exposed to contamination from pumice used in prostheses polishing. They encouraged using sterile pumice or combining it with disinfectants (0.2% chlorhexidine gluconate or 5% sodium hypochlorite). They also advise changing the polishing paste every day.

In response to the question of whether dental technicians disinfect prosthetics or dentures before shipping them to clinics, 61,9% of dental technicians said that they do. All prostheses should be carefully rinsed under running water, cleaned of debris, disinfected in a disinfectant that is registered with the Environmental Protection Agency and accepted by the American Dental Association, and only then should they be sent from the laboratory to the clinics in a plastic bag that is properly sealed and labeled, according to Runnells[16] in his overview of infection control in dental practice.

A total of 76.1% of dental laboratories did not disinfect impressions because they depended on dental clinics to clean any impressions delivered to their facilities. The absence of effective communication between dental clinics and these dental laboratories may be the cause of this. All impressions were cleaned at dental laboratories by the remaining 23.9%. As a result, this study demonstrates poor communication between dentists and dental laboratories, which is comparable to the findings of Kugel et al. [23], who found that nearly half of laboratory directors had received insufficient training in terms of disinfection techniques. The dental laboratories should essentially communicate regarding the state of every item that is sent out from their individual dental clinics in order to avoid confusion regarding whether an imprint had been disinfected or not and to avoid duplication of services. Every imprint or prosthesis should have a written note confirming that it has been cleaned with a specified disinfectant for a specific amount of time. If there is no such marking, it should be assumed that the object was not cleaned. When asked how they disinfect the prosthetics/dentures in the lab, 90.4% of dental technicians stated they use immersion as their technique of choice, while 9.6% claimed they use spraying. 90.4% of dental technicians said they have an appropriate waste disposal system in place in their labs when asked about it. In their text book on infection management, Kohli and Puttaiah[4] noted that while safeguarding the patient and the caregiver, a significant amount of medical waste is produced. Dental waste can be divided into two categories: regulated waste and non-regulated trash. A professional waste management business that regularly removes the clinic's hazardous waste should be under contract with the clinics. Pouring chemical waste down the drain is not advised.

Following completion of job activities, work surfaces and equipment should be cleansed and decontaminated using an appropriate liquid chemical germicide, according to the Centre for Disease Control and Prevention (CDC) [23,24]. According to the study's findings, 57.1% of respondents cleaned and disinfected their dental laboratories every day, 19.1% did so twice weekly, and 23.8% did so once a week. This unsettling practice renders the other safety measures worthless because the previously cleaned goods could become

contaminated once again by the bacteria, which can survive for up to seven days on surfaces and in the air. Dental laboratories should be cleaned and disinfected every day to ensure complete compliance with disinfection regulations.

The majority of responders (76,1%) had no recent training or refresher courses in infection control the year before. Only one (23.9%) of the respondents said they have received such training. This could indicate that there weren't any infection control refresher courses available at the time or that they were expensive. The low number of technicians who had taken refresher courses may also have been caused by a lack of time to enroll.

CONCLUSIONS:

Responses indicate a moderate level of awareness & compliance with infection control techniques recommended by the American Dental Association (there is varying levels of knowledge, attitude and infection control practices) . This is because none of the 21 dental laboratories had 100% compliance to infection control. This could be as a result of inadequate knowledge on infection control by most dental laboratory technicians. The results of this study indicated that there was substantial nonconformity to infection control measure in most of dental laboratories. There should be thorough inspection of the dental laboratories prior to licensing to ensure that all dental laboratories comply with the various infection control measures. Cross-contamination among dental team personals is a hazardous concern & that strict compliance with infection control protocols is mandatory in the dental clinics, as well as, in dental laboratories. Mandatory infection control continuing education courses and seminars should be conducted to update the dental technicians on the current infection control protocols. This will expand conformity to infection control principles. To avoid the spread of infection and to raise the degree of safety during oral health treatment, educational interventions must be made to boost the awareness and understanding of dental technicians. A good infection control program depends on effective communication and coordination of activities between the laboratory and dental practice. Cross-contamination that can affect dentists, dental office personnel, dental technicians, and patients can be avoided by using efficient infection control methods in the dental office and dental laboratory.

ACKNOWLEDGEMENTS:

The author would like to acknowledge all the dental laboratory technicians who participated in the study.

Financial Support & Sponsorship: Nil .

Conflicts of Interest: There are no conflicts of interest .

REFERENCES:

1. Notle WA. *Oral Microbiology with Basic Microbiology and Immunology*. 4th ed. CV mosby, St Louis, Missouri: The CV Mosby Company; 1982. p. 55. [Google Scholar]

2. Miller CH. Infection control. *Dent Clin North Am.* 1996;40:437–56. [PubMed] [Google Scholar]

3. Kahn RC, Lancaster MV, Kate W., Jr The microbiologic cross-contamination of dental prostheses. *J Prosthet Dent.* 1982;47:556–9. [PubMed] [Google Scholar]

4. Kohli A, Puttaiah R. *Infection Control & Occupational Safety Recommendations for Oral Health Professionals*. 1st ed. New Delhi: Dental Council of India; 2007. pp. 2–14. [Google Scholar]

5. Choel L, Grocgogeat B, Bourgeois D, Descotes J. Occupational toxic risks in dental laboratory technicians. *J Environ Med.* 1999;1:307–14. [Google Scholar]

6. Al-Kheraif AA, Mobarak FA. Infection control practice in private dental laboratories in Riyadh. *Saudi Dent J.* 2008;20:162–9. [Google Scholar]

7. Bhat VS, Shetty MS, Shenoy KK. Infection control in the prosthodontic laboratory. *J Indian Prosthodont Soc.* 2007;7:62–5. [Google Scholar]

8. Kaul R, Purra AR, Farooq R, Khatteb SU, Ahmad F, Parvez PA. Infection control in dental laboratories - A review. *Int J Clin Cases Investig.* 2012;4:19–32. [Google Scholar]

9. Marya CM, Shukla P, Dahiya V, Jnaneswar A. Current status of disinfection of dental impressions in Indian dental colleges: A cause of concern. *J*

Infect Dev Ctries. 2011;5:776–80. [PubMed] [Google Scholar]

10. Ngpal A, Chaudhary V. Infection control in prosthodontics. *Indian J Dent Sci.* 2010;2:5–10. [Google Scholar]

11. Kugel G, Perry RD, Ferrari M, Lalicata P. Disinfection and communication practices: A survey of U.S. dental laboratories. *J Am Dent Assoc.* 2000;131:786–92. [PubMed] [Google Scholar]

12. Washington, DC: OSHA Instruction CPL2-244B; 1990. Occupational Safety and Health Administration. Enforcement of Procedures for Occupational Exposure to HBV & HIV. [Google Scholar]

13. Centers for Disease Control. Guidelines for Infection Control in Dental Health Care Settings-2003. [Last accessed on 2017 Jul 19];*MMWR.* 2003 52(RR-17):1–66. 2003. Available from: http://www.cdc.gov/mmwr/PDF/rr/rr5217.pdf . [Google Scholar]

14. Washington, DC: Technical Bulletin; 1995. Headquarters Department of the Army. Disinfection and Sterilization of Dental Instruments and Materials; pp. 1–12. [Google Scholar]

15. Firoozeh F, Zibaei M, Zendedel A, Rashidipour H, Kamran A. Microbial contamination of pumice used in dental laboratories. *Healthc Low Resour Settings.* 2013;1:18–21. [Google Scholar]

16. Runnells RR. An overview of infection control in dental practice. *J Prosthet Dent.* 1988;59:625–9. [PubMed] [Google Scholar]

17. Verran J, Kossar S, McCord JF. Microbiological study of selected risk areas in dental technology laboratories. J Dent. 1996; 24: 77-80. Ref.: https://goo.gl/oOZBkZ

18.Dental Laboratory Relationship Working Group of the Organization for Safety and Asepsis Procedures (OSAP). OSAP Position Paper: Laboratory Asepsis. 1998. Ref.: https://goo.gl/HolAzn

19.Infection control recommendations for the dental office and the dental laboratory. Council on Dental Materials, Instruments, and Equipment. Council on Dental Practice. Council on Dental Therapeutics. J Am Dent Assoc. 1998; 116: 241-248. Ref.: https://goo.gl/Mw3ZPM

20. Porter SR, Peake G, Scully C, Samaranayake LP. Attitudes to cross-infection measures of UK and Hong Kong patients. Br Dent J. 1993; 175: 254-257. Ref.: https://goo.gl/RhQFxY

21.Twomey JO, Abdelaziz KM, Combe EC, Anderson DL. Calcium hypochlorite as a disinfecting additive for dental stone. J Prosthet Dent. 2003; 90: 282-288. Ref.: https://goo.gl/dzlw3P

22. CDC Guidelines for infection control in dental health-care settings-2003. MMWR 2003. 52 (No. RR-17). Ref.: https://goo.gl/BBOzr7

23. Croser D, Chipping J. Cross Infection Control in General Dental Practice: A practical guide for the whole dental team. London: Quintessence. 1989.

24. Dickinson, Sharon K, Richard D, et al. Guidelines for Infection Control in Dental Health Care Settings 2013.