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# IMPRESSION'S DISINFECTION PROTOCOLS AMONGST INTERNS IN MUMBAI AND NAVI MUMBAI: A CROSS-SECTIONAL STUDY.

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## ABSTRACT
**Introduction:** Oral cavity being the niche for a plethora of microorganisms raises the chances of cross infection. Thus the process of disinfection is fundamental to prevent the bidirectional transmission of microorganisms. **Aim:** The aim of the present study was to assess the knowledge and practice protocols regarding disinfection of impressions amongst interns in Mumbai and Navi Mumbai **Method and Materials:** The study design was a cross sectional questionnaire based survey. The study was carried out amongst 386 interns from six dental colleges across Mumbai and Navi Mumbai who were selected through simple randomized sampling technique. Data was collected through a self designed pretested questionnaire and a descriptive statistical analysis was conducted. **Results:** The necessity of disinfection was felt by 83.5% but only 15.2% interns regularly disinfected impressions using disinfectants. While 71.6% of them never scrubbed their impressions, 88.6% of interns always rinsed their impressions. Gluteraldehyde was the choice of disinfectant for impression compound, alginate and zinc oxide eugenol. Disinfection of alginate impressions was done using the technique of cotton soaked in disinfectant by 10.88% and immersion was the technique followed for zinc oxide eugenol and impression compound. The necessity to upgrade their knowledge was felt by 95.3% interns through means of seminars, symposiums and workshops. **Conclusions:** The study concluded that though the interns are aware about the necessity to carry out disinfection of impressions yet the practice of using a chemical disinfectant with the right technique does not prevail. Thus, there is a need for upgradation and stricter reinforcement of disinfection protocol.

**KEY-WORDS:** Academic Skills, Continuing Dental Education, Dental Impression, Dental Students, Disinfectants, Prosthodontics.

## INTRODUCTION
An abundance of micro organisms thrive in the oral cavity in an environment that is apt to serve as a niche for their multiplication. These include a plethora of bacteria and viruses; some that are gravely hazardous to health such as Herpes virus, Human Immunodeficiency Virus, Hepatitis virus, *Mycobacterium* spp.[1] Just as infections are transmitted from instruments that do not meet the sterilisation requirements or from the dentist to the patient; they can also be transmitted in the reverse direction; from the patient to dental surgeon, thus making it a bidirectional phenomenon. Patient saliva and blood serve as the prime vectors for the transport of these micro organisms. Hence any appliance that has been in contact with the patient's oral cavity has the competency of transmitting micro organisms to those who come in contact with it. These also include dental impressions which when not disinfected are a potential risk for both, the dental surgeon and also the laboratory technicians who come in contact with the casts poured from these contaminated dental impressions as seen in a study conducted by N.Almortadi.et.al (2010). Results of the study deduced that 95% of the laboratory technicians who took part in the study received impressions contaminated with blood and 15% came across voids containing blood present in the trimmed peripheries of the impressions.[2] This makes disinfection of dental impressions an obligatory requirement. The procedure

involves rinsing the impressions under running water followed by scrubbing the impressions to eliminate the bio burden and finally disinfection of the same using a suitable chemical disinfectant. Immersion and spraying are the two techniques that are routinely used to disinfect impressions.[3] It is vital that the disinfectant selected and the technique incorporated, are compatible with the impression material; failure of which can lead to dimensional changes of the impression. In a study conducted by Marya.M.C.et.al(2011), it was reported that only 24.1% disinfected impressions using a chemical disinfectant while majority merely washed them under running water.[4] Thus it is imperative to impart knowledge regarding disinfection of impressions from the very beginning of dental education. It is not just the possession of knowledge regarding disinfection but also accurate execution of it from the very beginning of dental practice that builds a strong foundation for a safe and healthy treatment for both the dentist and the patient. This background gave rise to the need to carry out a survey amongst the undergraduate interns in dental colleges to assess their awareness and the prevalent practices regarding disinfection of impressions.

## AIM AND OBJECTIVES

The aim of the study was to evaluate the awareness and prevalent practices regarding disinfection of impressions amongst under graduate interns in dental colleges.

**The primary objectives of the present study were**

1. To investigate whether the interns at dental colleges possess adequate knowledge about disinfection of impression materials.
2. To investigate the disinfection protocols followed by the interns after impression making.

The secondary objective of the present study was:

3. To investigate if continuing education and additional training regarding disinfection needs to be implemented.

## MATERIALS AND METHOD

The present study was a cross sectional questionnaire based survey carried amongst three hundred and eighty six interns from six dental colleges across western Maharashtra. Interns being at the threshold of entering private practice were considered apt for the study. Simple randomized sampling technique was used to determine the sample population. Interns from the six dental colleges were approached after obtaining permission from the Dean/Principal/head of the respective institution. Prior to the start of the study, clearance and permissions were obtained from Institutional ethics committee (IEC) after the study protocol was sent and reviewed by two blinded reviewers (letter dated 27th January, 2016).

Under the inclusion criteria, all the interns willing to participate in the present survey and giving a written informed consent were included. It excluded those interns who were not present on the day of the survey and up to two rounds of follow up. Sample size was determined using single proportion formula as follows

$$N = \left\{ \frac{Z\alpha\, p(1-p)}{d} \right\} 2$$

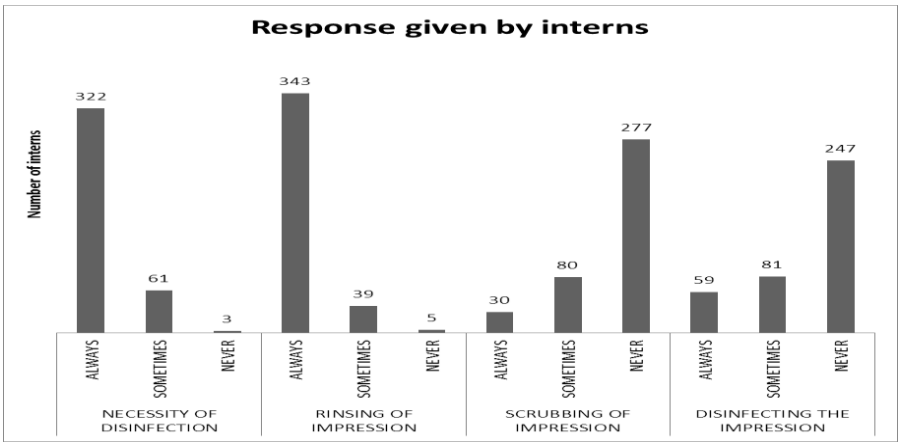
In the above formula that was used, N was the sample size that was estimated. $Z_{\alpha}$ was the variant of type one error, p was the proportion of interns following the correct protocols for disinfection of impressions assumed at 50% and d was the estimated error in the present study fixed at 5%. Hence a minimum of 384 interns were required to participate in the present study.

Data required for the present study was collected through a self designed, pre tested questionnaire. The questionnaire comprised of three sections. Section A and B consisted of questions to evaluate the knowledge and prevalent practices amongst interns regarding disinfection of impression. Section C comprised of attitude based questions to determine in which many ways the interns would like to reinforce their knowledge regarding the same. Section A and C were compulsory sections which were to be answered by all those participating in the study. Only those who carried out disinfection using a chemical disinfectant were told to answer section B which evaluated the disinfectant and technique used for disinfecting impressions made from the following three most commonly used materials by under graduate dental students namely Alginate, Zinc oxide eugenol and Impression compound. The questionnaire was hand delivered amongst interns and collected on completion with minimum two rounds of follow up by the primary investigator.

Data collected through questionnaire was coded and entered in the Microsoft office excel sheet (version 2010). Descriptive statistical values in frequency and percentage were calculated using statistical package for social sciences (SPSS, V.2.0, IBM).

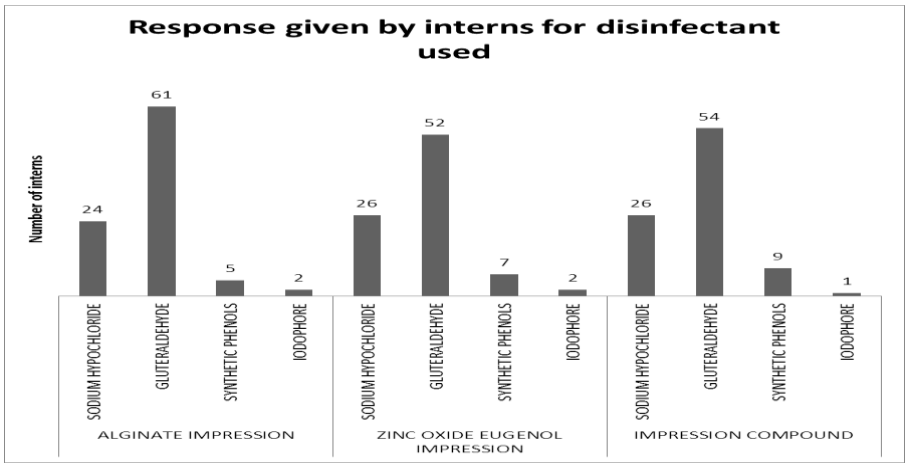
## RESULTS

A descriptive statistical analysis was carried out and the results were formulated in the form of frequency and percentage. While evaluating the attitude of students towards the necessity of disinfection, a majority of 83.5% of the participants agreed that it was necessary to always disinfect an impression. A majority of 88.6% participants always rinsed their impression but an alarming 71.6% of them never scrubbed their impressions. Of the 386 interns who participated in the study, only 15.2% did use a chemical disinfectant always while 20.9% used it sometimes. A detailed description of the results for section A has been mentioned in graph one.

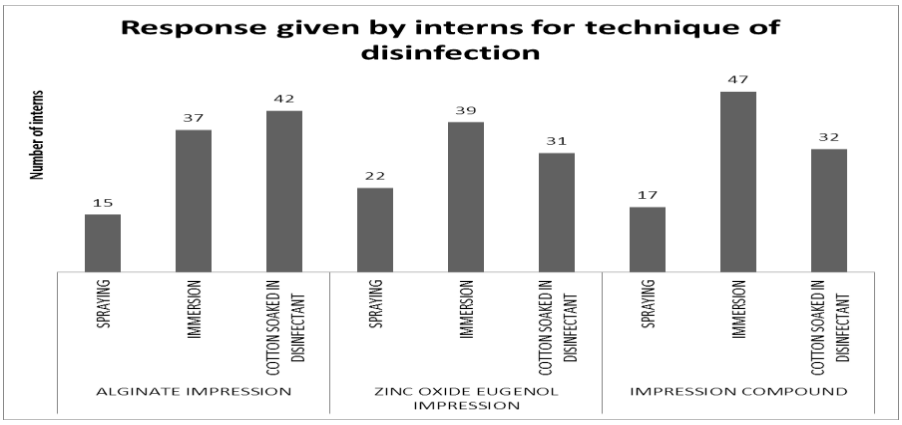



**Graph 1: disinfection protocols**

Section B was answered by only those participants who used a chemical disinfectant. This section evaluated their knowledge and protocol for disinfecting impressions made of either of the following three impression materials; alginate, zinc oxide eugenol and impression compound. The results revealed that gluteraldehyde was the commonest choice of disinfectant amongst interns. Of the total participating interns, 15.8% interns used gluteraldehyde to disinfect impressions made using alginate, 13.47% interns used gluteraldehyde to disinfect impressions made from zinc oxide eugenol and 13.9% of interns disinfected impressions made from impression compound using gluteraldehyde. While cotton soaked in disinfectant was the most adopted technique for disinfecting alginate impressions by 10.88% of the total number of participating interns, immersion was the technique commonly followed for impressions made from zinc oxide eugenol by 10.10 % of interns and similarly immersion was the commonly used technique by 12.17% interns for impressions made from impression compound. A detailed description of the results for section B has been mentioned in graph two and three.




**Graph 2: disinfectant used for disinfection of impressions**




**Graph 3: technique of disinfection followed for disinfection of impressions**

Section C of the questionnaire was designed to assess the many ways in which the students would like to upgrade and reinforce their skills and knowledge regarding disinfection. Of the total number of participating interns, 95.3% were enthusiastic and felt the need to upgrade their knowledge and practical skills. When given a choice between seminar, symposiums and workshops, 58.91% of the participants agreed that all of the above were excellent ways to improve their existing skills. Majority of the participants were of the opinion that disinfection is as imperative as any other dental procedure and should be evaluated in their exams. Table one gives a detailed description for the results to the section C of the questionnaire.

**Table 1: Necessity to upgrade knowledge and skills**

| QUESTION ASKED | ANSWER | FREQUENCY (NUMBER OF INTERNS) | PERCENTAGE |
|---|---|---|---|
| Necessity for the need to upgrade the knowledge and skills regarding disinfection of impression | YES | 396 | 95.3% |
| | NO | 17 | 4.4% |
| Means to upgrade their knowledge and skills regarding disinfection of impressions | SEMINAR | 60 | 15.5% |
| | SYNPOSIUM | 89 | 22.99% |
| | WORKSHOPS | 7 | 1.80% |
| | ALL OF THE ABOVE | 228 | 58.91% |
| Enforcement of disinfection of impression strongly in the curriculum | YES | 352 | 91% |
| | NO | 34 | 8.8% |
| Evaluation of disinfection of impressions in practical exams | YES | 249 | 64.3% |
| | NO | 137 | 35.4% |

## DISCUSSION

The human saliva is a reservoir of grave diseases like Human Immunodeficiency Virus, hepatitis B, Tuberculosis which puts the onus of disinfection and sterilisation on the oral health care workers.[4] India is one of the leading countries in maximum Tuberculosis associated mortality, chronic Hepatitis B virus carriers and is prophesized to have fifty million HIV cases by 2025.[5-6] The Dental Council of India (DCI), which regulates the India dental profession, emphasises on a strict disinfection protocol. However due to lack of awareness of sterilisation procedures, strict execution or inadequate resources, the norms are half heartedly followed. In order to tackle this problem it is necessary to harness the minds of the budding young dentists who are at the precipice of independent practice. Thus in this study the target population was aimed at interns whose knowledge and attitude towards disinfection protocols were evaluated through a self designed, pre tested questionnaire.

The American Dental Association (ADA) recommends impressions to be rinsed to remove saliva, blood and debris followed by disinfection.[3] Thus, rinsing and cleaning are the most primary steps post impression making and should be a habitual practice. According to the present study, 88.65% participants executed rinsing of impressions where as 71.6% never practiced scrubbing of their impressions. These results are in synchrony with that of Marya.M.C.et.al where 75.9% routinely followed washing of the impressions.[4] In another similar study conducted by N.Almortadi.et.al, only 2.6% of the participants brushed their impressions and in contrary to the present study only 37.2% washed their impression with running water.[2] In a similar study by Amin.F.et.al, more than one third of the practitioners participating in the study never carried out impression scrubbing after making impression.[6] This data is alarming considering that rinsing of impressions is highly essential as it eliminates up to 90% of microorganisms and visible debris.[5]

According to the present study 63.9% of the interns who participated never practiced disinfection while 20.9% sometimes practised the use of chemical disinfectant. These values reflect upon the gap that exists between the theoretical awareness versus practical execution of disinfection protocols. Thus a mere 15.2% sincerely followed disinfection post impression making. Many studies also reveal similar lag in disinfection protocol. Marya.M.C.et.al in their study reported 24.1% respondents who carried out impression disinfection.[4] Similarly 44% of the respondents did not disinfect impression post clinical procedure as studied by Amin.F.et.al.[7] Only one third of the participants disinfected their impressions as per the study conducted to assess the prevailing knowledge and practices about dental impressions disinfection by Amin.F.et.al.[6]

As per the present study, of the 15.2% who practiced disinfection, the commonest used disinfectant was gluteraldehyde followed by sodium hypochlorite for all materials. This is accordance to the study by Amin.F.et.al for evaluating Nine dental colleges in Karachi where gluteraldehyde was the most commonly used disinfectant.[6] In contrary to the present study, a study conducted by Amin.F.et.al amongst the paramedical staff states that sodium hypochlorite was the most commonly used disinfectant for impressions made from impression compound and zinc oxide eugenol impression material where as for disinfection of alginate impressions 11.8% participants mentioned the use of gluteraldehyde and 17.6% participants mentioned the use of sodium hypochlorite. [7] Gluteraldehyde being cost

effective may be the obvious choice for institutions with limited economic resources.

The technique used for disinfection of impression has to be compatible with the material used. The technique should be able to adequately disinfect the impression and at the same time it should not cause any dimensional changes. The commonest followed technique included immersion and spraying. Immersion is more efficient since it wets more surface area however spraying reduces dimensional changes though access to undercuts is poor.[8-9] Dipping the impression in disinfectant with varying time periods was the commonest technique as reported by Amin.F.et.al.[6-7] However the use of cotton soaked in disinfectant has no statistical data to support its efficiency. The current study revealed that cotton soaked in disinfectant was the most commonly used technique for disinfecting impressions made from alginate as stated by forty two participants and immersion was the choice of technique for zinc oxide eugenol and impression compound as mentioned by thirty nine and forty seven respondents respectively. Z.Jafari.et.al had reported in their study that dental students transferred impressions to laboratory without correct cleaning and disinfection.[10] Ajami.et.al in their study showed that knowledge of disinfection in theory was inadequate and practice experience in the disinfection protocol was a must.[11]

In the current study, 95.3% of the participating interns realised the necessity to upgrade their knowledge and skills regarding disinfection protocols. They believe that combination of Continuing Dental Education programs such as workshops, symposiums and seminars along with strict enforcement of disinfection protocol in theory and practical exams will improve execution of correct sterilization procedure. Lavvaf.et.al in their study highlighted that 66% participants believed that workshops, seminars and academic conferences were useful for knowledge advancement for the same.[12]

One possible limitation of the present study is that the data collected is from a single geographical area, which may be further improved by inclusion of a larger area for future comparisons. Similar studies can also include comparison of disinfection protocols between Prosthodontists, post graduate-undergraduate dental students and general dental practitioners. This can shed light on the sources of information available at their disposal to update their knowledge. We hence assume the extrapolation of the results of the present study to be generalised to all the interns of the country.

## CONCLUSION

The current study thus infers that majority of interns who participated in it were aware about the necessity of disinfection and were self motivated to regularly rinse the impression under running water. But there was a glitch in the enforcement of protocols that involved scrubbing of impressions and use of a chemical disinfectant along with the right technique. Thus very few interns practiced the same. The inadequacy of proper knowledge regarding disinfection leads to inability to opt for the right disinfectant and technique that the impression material demands. It can be surmised that majority of the interns are motivated to excel in their knowledge and skills regarding disinfection protocols and this can be best achieved at the institutional level where there is an approachable faculty that can actively involve students into activities that reinforces hygienic practice protocols.

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