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STERILISATION OF ROTARY CUTTING INSTRUMENTS – A SURVEY ON CURRENT PRACTICES

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ABSTRACT: Aim: The aim of this study was to obtain the information regarding present sterilization procedures followed for sterilizing Rotary cutting instruments or burs in routine dental practices using a Questionnaire and to assess the effectiveness of those procedures in preventing cross infection, and to recommend an effective sterilization protocol to be followed while using rotary cutting dental burs.
Materials and Methods: A questionnaire which was pre-validated was used to collect the information regarding the methods followed to sterilize the rotary cutting instruments in 100 dental clinics in and around Hyderabad and the effectiveness of those methods were analyzed using descriptive analysis. **Results:** The procedures undertaken by our clinicians in their day to day practice to resterilize rotary cutting burs are poorly effective, the risk of cross-infection is very high with those methods. **Conclusion:** The cleaning and resterilization procedures of rotary cutting instruments that were followed regularly in clinical practice were not adequate, and more rigorous procedures are needed. If such procedures cannot be devised, these instruments should perhaps be considered single-use devices.

KEYWORDS: Sterilization, Questionnaire, Rotatory, cutting Instruments, Burs

INTRODUCTION

The Rotary cutting instruments due to their tiny and complex architecture makes the sterilization procedure difficult.[1] The risk in the field of dentistry while using rotary cutting instruments is real and there is always potential for transmission of infections due to the presence of saliva which is potentially an infectious fluid and also due to the presence of every possibility for blood contact.[2] The most dreadful diseases that can be transmitted through cross infection are Aids, Hepatitis, CJD (Creutzfeidt_Jakob Disease)[3,4] Herpes, Tuberculosis etc.,

The dental burs while using become contaminated with blood, saliva, necrotic tissue and pathogens; therefore, if such devices are to be reused, it is important to ensure sterility. Due to financial issues dental burs are usually reused after sterilization in day to day practice. For the Sterilization to be more successful, used instruments must be thoroughly disinfected and pre-cleaned before sterilization,[5] to remove debris, by either brushing or ultrasonic cleaning, otherwise subsequent sterilization may be jeopardized by insulation of blood- or saliva-coated microbes from the sterilizing agent.

These steps must be conducted carefully to assure success in preventing cross infection. Cleaned instruments or new instruments that are to be sterilized must be packaged prior to sterilization to protect them from recontamination before use.

The five sterilization techniques currently used in dentistry to sterilize Rotary cutting burs are

1. Application of steam under pressure in a steam autoclave.
2. Application of dry heat in a sterilizing oven.
3. Sterilization by chemical vapour.
4. Ethylene oxide sterilization
5. Boiling Water

The other best option to prevent cross infection is to use newer instruments in each patient.

In this study a survey was conducted among 100 dental practitioners by preparing a questionnaire which consists of questions regarding the sterilization techniques followed to sterilize rotary cutting instruments in their day to day practice (**Fig. 1).**

The effectiveness of those sterilization procedures in preventing cross infection was analyzed.

Material and Methods:

The study group comprised of 100 dental practitioners in around Hyderabad. A questionnaire containing four questions regarding the disinfection, pre-cleaning and sterilizations methods that are being followed in their

Name of the practitioner:

Place:

Questionnaire:

1. Disinfection of soiled rotary cutting instruments prior to sterilization

☐ Yes
☐ No

2. Pre-cleaning of soiled rotary cutting instruments prior to sterilization

☐ Yes
☐ No

3. Whether following both dis-infection and pre-cleaning procedures before sterilization Rotary cutting instruments?

☐ Yes
☐ No

4. Method of sterilization of the Rotary cutting Instruments

	Boiling Water	Chemical vapour streriliization	Dry heat sterilization	Ethylene oxide steriliization	Autoclave	New Instruments
Rotary cutting instruments						

Fig. 1. Questionnaire format.

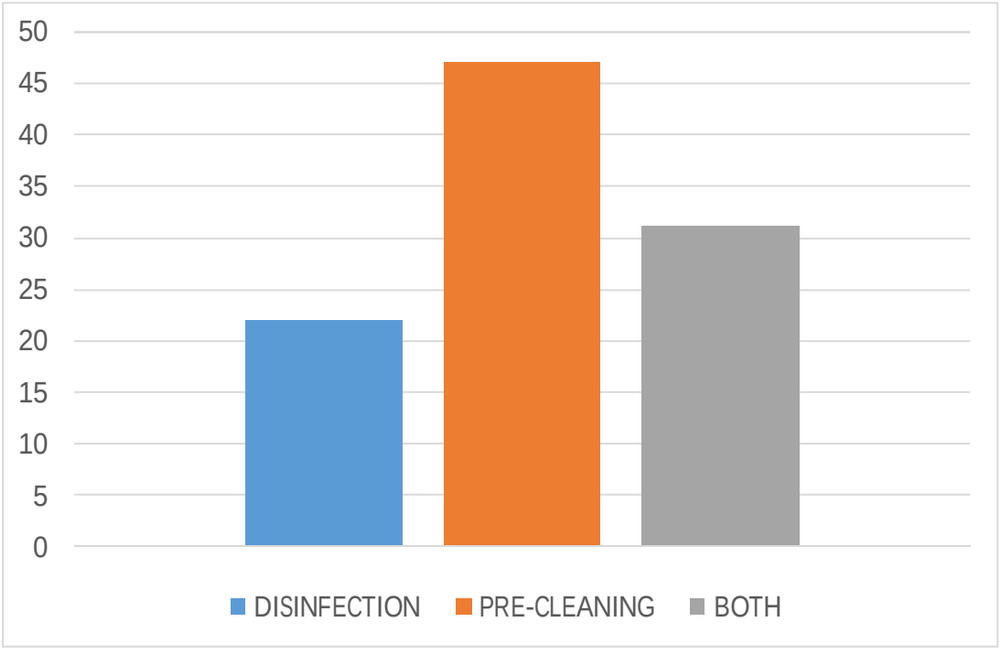

Fig.2. Graph showing the different methods of sterilization methods of Rotatory Instruments.

clinics to resterilize the crown cutting burs and cavity cutting burs was prepared and given to the practitioners and was asked to fill the form. The answers filled in by the subjects in the given questionnaire were evaluated according to the type of question. Data was analysed using descriptive analysis and graphs.

Results

Of all the 100 subjects participated in this study, 22 practitioners were following disinfection procedure, and 47 patients were following only pre-cleaning process without disinfecting the rotary cutting instruments and 31 practitioners were following both the procedures before sterilization **(Fig.2)**

When it comes to sterilization method, 19 members were following boiling water method, 32 members were using chemical sterilization method and 7 members were using dry heat sterilization method, 41 members were using Autoclave method and only 1 member was using new burs for every patient and no one used ethylene oxide sterilization method before reusing the rotary cutting instruments.

Discussion

Sterilization is a process of recycling the instruments, so that all forms of life including the most heat resistant forms, bacterial spores are killed. The purpose of sterilization or instrument recycling is to protect patients by avoiding disease transmission by cross infection. The instrument processing or recycling involves various steps aimed at killing and removing microbes on instruments that are contaminated and maintaining those instruments in an aseptic state until they are used again. Resterilization process is simply the repeated application of a sterilization procedure to an instrument or device to remove contamination, allowing for its use again for treating multiple patients.

Used instruments must be thoroughly disinfected first and pre-cleaned before sterilization, to remove debris, by either brushing or ultrasonic cleaning.[6] Ultrasonic cleaning is much safer than hand-scrubbing. Ultrasonic cleaning is also an effective and time-saving method when compared to hand scrubbing.[7]

Several studies have found that the new rotary cutting burs as packaged by the manufacturer, were not sterile.[8] However, sterilization procedures were 100% effective for unused burs, they showed no contamination following the 72-hour incubation period, but not all sterilization procedures performed on previously used burs were 100% effective. Several samples showed bacterial growth from resterilized burs. The reason behind this failure of sterilization procedure is the inability to remove all biologic material during cleaning procedures with the available methods.[9] It is proven that there is always 5% risk is always there, even if all the three steps like disinfection, precleaning and Sterilization are undertaken to resterilize the used rotary cutting burs.[10] When these three steps are not followed properly, or if any one step is skipped, the risk percentage for cross infection is even more higher.

Sterilization procedures which were used routinely for used burs were not completely effective in eliminating the risk of cross infection,[11] so further research is needed to generate an effective sterilization protocol.

Future studies should focus on finding out the best methodhology for precleaning these rotary cutting instruments. If such procedures cannot be determined, these instruments should be considered as single-use instruments.[12] This would definitely decrease the risk of cross infection.

The results of this present study has shown that currently in many dental practices, the sterilization procedures undertaken were not 100% effective in preventing cross infection, so the best recommended method to prevent cross infection is to use newer instruments in each patient.

CONCLUSION

Implementation of infection control procedures like disposing used burs and using new rotary cutting instruments in each patient does cost money and time, but it provides safe and healthy environment for both patients and staff and in turn the whole community.

The convenience, and infection control benefits must be weighed against the real concerns of additional cost.

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