

ENDODONTIC INSTRUMENT STERILIZATION 'PRACTICES & MONITORING IN PRIVATE DENTAL CLINICS'

Dental Science

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ABSTRACT

Introduction: Infection control procedures are an integral part of modern dentistry and are continually evolving to meet the dental profession's high standards. In absence of adequate infection control procedures there is realistic potential to transmit pathogenic microbes via endodontic instruments.

Aim & Objectives : The aim of this article is to present practice trends among dental practitioners in central India towards sterilization and disinfection of endodontic instruments. The study was also intended to review the knowledge, attitude and practice of the dentist towards sterilization of endodontic instruments.

Materials & method: A questionnaire containing 7 questions was distributed to private dental practitioners in central India. The questionnaire included questions about various methods of sterilization and disinfection available and utilized for endodontic instruments in routine dental practice.

Result: It was seen that 42% dentists sterilize files in between appointments using chemical agents only, 12% used chemical as well as glass bead sterilizer while 0.04% used chemical method along with Autoclaving.

Conclusion : Many of the dental practitioners were not following the basic protocols of the sterilization. There is an urgent need to increase the awareness amongst dentists regarding sterilization of the endodontic instruments as it can be highly contagious.

KEYWORDS

Infection control, endodontic instruments, sterilization

Introduction:

Micro organisms are responsible for various infectious processes in the human body. Control of infection is an important factor for providing comprehensive medical and dental care. Contamination directly and indirectly leads to transmission of infectious agents.¹ Cross contamination among staff and the patients is a matter of concern which is faced in the routine dental practice.

This can occur by direct exposure or via contaminated instruments or surface. Blood and saliva have been found to be high-risk sources for contracting hepatitis B, HIV and herpes. Endodontic treatment involves cleaning and shaping of the root canals. This can be performed with the help of hand and rotary instruments which are usually reused. Since endodontic treatment involves accumulation of the debris on the flutes of the files, these endodontic files have to be cleaned, disinfected and sterilized very effectively^{2,3}.

Sterilization and disinfection of the instruments used in routine dental practice will prevent such cross contaminations. Reusable instruments if not sterilized and disinfected properly may lead to cross infection.⁴ In endodontics various instruments used like files, reamers, gate glidden drills and peeso reamers are used for the cleaning and shaping of the root canal and to eliminate the bacterial population in the pulp canal space. Various means to sterilize these instruments such as dry heat sterilizer, autoclave, ethylene dioxide gas, glass bead sterilizer or hot salt sterilizer, etc.⁵ Chemical disinfectants are bacteriocidal for most of the non sporulating micro organisms after 15 mins of exposure but are infective against spores and unreliably effective against the viruses, however autoclaving can provide sterilization in short span of time.⁶

Various types of diseases can be transmitted by indirect contact when endodontic files contaminated are use from one patient to another patient without proper disinfection or sterilization between uses⁷. This study was done to evaluate the knowledge, attitude and practice of the general dental practitioners towards sterilization and disinfection in endodontics.

Materials and Methods:

A cross sectional study was performed consisting of general dental practitioners. Ethical committee approval was taken from the

concerned authority before the start of the study and informed consent was taken from all the participants.

The study was done with the use of specially formulated questionnaires. First pilot study was carried out to test the validity of the questions. The questionnaires were distributed to the nearby general practitioners in central India by hand and their responses were collected and entered in a prescribed format. Privacy of the responses given was guaranteed and the results were kept confidential.

Total 7 questions were selected . The study consisted of 50 general practitioners.

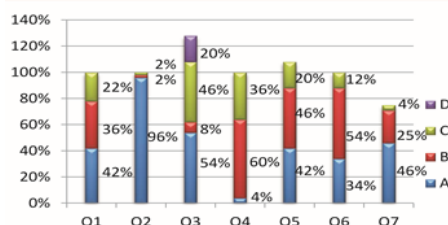
A) Inclusion Criteria: The dentist must be doing general dental practice.

B) Exclusion Criteria: Dentists with Master degree in Endodontics.

Dentists not willing to participate in the study.

Results :

All the scores of the participants were collected and statistical analysis was done using student 't' test . The study showed that 42% of dentists perform 1-2 root canals per day and 96% were aware of the cross contamination occurring due to reuse of root canal instruments. According to the survey 54% of dentists uses glass bead sterilizer for sterilizing the root canal instruments, 46% are using autoclave and 20% uses chemiclave. In between the patients, 42% dentists uses chemical method for disinfection whereas 46% uses glass bead sterilizer. Also, 54% of dentists does not sterilize the new endodontic files before using it in patients. A large proportion of dentist i.e. 46% uses sterilization pouches for instrument packing after sterilization.



Discussion :

Proper sterilization of equipments which are used in invasive procedures is paramount in any invasive medical procedure. Infection control procedures is an integral part of modern dentistry and they are continually evolving to meet the dental profession's high standards. It constitutes of various methods to prevent the spread of infections. Important issue is that they should be simple and practical and could be easily done by dentist⁸. Sterilization is a process to render an object free from viable organisms including bacterial spores and viruses. So, sterilization is an "all-or-none" phenomenon⁹.

The basic principles of asepsis and infection control are: Use of gloves, protective eye wear, plastic aprons, use of properly disinfected and sterilized instruments, proper disposal of sharps and infected waste material¹⁰.

Dental environment often includes physical, chemical and biological risks, both to the professionals and the patients. A biological risk consists of contamination by microorganisms on equipment, materials or instruments used in the clinical practice. This makes occupational infections and cross infections possible if not properly sterilized and disinfected before use¹¹.

While doing root canal treatment this type of cross infection can occur through endodontic instrumentations. These instruments often becomes coated with vital and necrotic tissue, dentin chips, blood by-products or other types of potential bacteria. These heavily contaminated instruments may present a challenge to all practical methods of disinfection or sterilization¹². Due to the design of the endodontic files; it is very conducive for the microorganisms and debris to be anchored into them¹³.

In the present study we found that most of the general dental practitioners were unaware of the sterilization knowledge. 96% of the practitioners were aware of the fact that cross contamination occurs due to re-use of endodontic instruments. This finding were in concurrence with the study¹⁵ wherein 99% perceived that cross infection can occur with the use of unsterilized endodontic rotary files and all of them considered importance of sterilization to prevent it.

It was found in our study that 54% of dental practitioners uses glass bead sterilizer followed by 46% practitioners who use autoclave to sterilize root canal instruments, in contrast to study¹¹ where 46.7% dentists used glass bead sterilizer for sterilizing root canal instruments. In another study, Venkatasubramanian R⁸ reported that nearly 81% of the dental clinics used autoclaving for the sterilization. Our results were in accordance with the study carried out by Matsuda JK¹⁶ et al in the municipality of Sao Paulo, which reported that autoclave was used by 69.38% of participants. Mallick A et al,¹⁷ reported that 81% of the clinics used autoclaving method of sterilization.

Used endodontic instruments should be thoroughly cleaned before sterilization to remove debris. Endodontic files supplied by the manufacturers are not pre-sterile usually but recently certain endodontic files have been introduced which are pre-sterile^{18,19}. In our study, 54% of practitioners were not sterilizing their new endodontic files before use in patients in comparison to study¹³ where 62.5% practitioners followed the sterilization protocols. One study found that sterilization techniques were 100% effective for only 2 situations when the new burs and files that were sterilized before first use¹⁴. A similar finding was reported in a study¹⁵, according to which 60% said they will not sterilize new endodontic files before use even though majority perceived the importance of sterilization.

In 2006 Germany determined that endodontic instruments be classified as critical class B instruments given that they are in close contact with tissues and blood.²⁰ In 2007, the Department of Health of the United kingdom recommended that either endodontic files be considered as disposable instruments or that the most effective sterilization method available be employed. As mentioned above, previous studies demonstrated that manual or ultrasonic cleaning are not effective in removing organic debris from endodontic files.^{21,22} It was seen in our study that 4% of the dentists were using root canal instruments only once.

Inactivation of micro-organisms are done using Glass bead sterilization which uses small glass beads (1.2-1.5 mm diameter) and high temperature (217°C- 232°C) for brief exposure times (45

seconds). These devices have been used for several years in the dental profession. According to the CDC guidelines²³ it is indicated that there is a risk of infection with this device because of potential failure to sterilize dental instruments. A study done by Venkatasubramanian R⁸ showed that the files sterilized by glass bead were 90% sterile and those with glutaraldehyde were 80% sterile and the files sterilized by lasers and autoclave were completely sterile. However, it was found in our study that 46% dental practitioners were using glass bead sterilization to sterilize the root canal instruments in between appointments whereas only 20% were using autoclave even though they were aware of cross-contamination through instrumentations.

Conclusion :

This study results showed that the sterilization and disinfection efforts taken by the dental practitioners were not satisfactory. Some of the dental practitioners were having highly positive attitude and practice of maintaining sterilization of the endodontic instruments, while others were extremely negative. Motivational program, seminars or workshops should be arranged to increase the awareness of the sterilization of endodontic instruments.

Limitations of study: A large sample size will be required to corroborate our findings

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Conflicts of interest: The author declare that they have no conflict of interest.

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