Knowledge and Efficiency of Sterilization of Endodontic Instruments in Dentistry: A Cross-Sectional Survey

Survey

Introduction
Sterilization of instruments is the main concern for infection control in all health care procedures. According to CDC (Centers for Disease Control and Prevention) guidelines, endodontic instruments (files) are classified as critical instruments [1]. Thus, all the endodontic files should be adequately cleaned and sterilized before use and re-use. Endodontic files are considered a reusable instrument [2]. As a healthcare worker, dentists play a critical role in infection control. Thus, they are an important population to study their level of knowledge, attitude and behavior regarding sterilization. Thus, the aim of the present survey is to study and evaluate dentist’s knowledge of sterilization of endodontic instruments and to explore the need for a new device for sterilization of endodontic files that can be done chair-side in between two consecutive appointments.

Materials and Methods
A cross-sectional study was performed which included general dental practitioners, post-graduate students, endodontists and other specialist dentists. A questionnaire was prepared which comprised several questions that helped in the assessment of the knowledge of the dentist (Fig. 1). This questionnaire was distributed to 169 dentists all over India using online survey method. The emails were sent randomly without knowing the location of the dentists for random and blind sampling of the participants. Based on the answers received, the data was subjected to statistical analysis.

Results
98% of the dentists agreed that endodontic files can be re-used. 49% of the dentists reported that new endodontic files should be sterilized before first use (Fig. 2).

99% of the dentists surveyed practiced sterilization of files before their re-use (Fig. 3). Out of these, 60% used autoclave, 41% glass bead sterilizer, 16% cold sterilization and 2% hot salt sterilizer. (Fig. 3)

98% of the dentists clean the files before sterilization (Fig. 2). Out of these, 55% used manual technique, 32% ultrasonic bath and 13% synthetic sponge method. (Fig. 4)

The participants were questioned about their interest in a new device that is quick, compact, and can be used chair-side in between two consecutive appointments. 90% of the participants were interested in pursuing such device. Thus, there is a need of a small, easy to use, device that can sterilize the endodontic instruments in few minutes. Also the devices should have appendages for adequate pre-cleaning of the endodontic instruments.

Discussion
The goal of sterilization is to protect patients and health care workers by preventing cross-contamination from instruments. The process involves a series of sequential steps aimed at removing and killing microbes on contaminated instruments and maintaining those instruments in an aseptic state until they are reused [3]. These steps must be conducted judiciously to assure success and to reduce chances of disease spread or physical injury to those handling the contaminated instruments. Thus, a thorough knowledge of sterilization procedure is essential for a dentist. This survey aims to evaluate the knowledge and attitude of dentists towards sterilization of endodontic instruments. Several studies demonstrated that new files removed from the manufacturer’s packet contained debris [4-6]. Eldik et al [4] also showed that new files removed from manufacturer’s packet were not sterilized. Thus, the new files should be sterilized before use. The 169 dentists were asked whether they were sterilizing the new files before use. 51% accepted that they were not sterilizing the new files. Thus, there is a need to educate and train the dentists that even new files need cleaning and sterilization before use. Various methods of sterilization of endodontic instruments can be enlisted as steam sterilization (autoclave), the use of disinfectant (endodontic files which include glass bead and hot salt sterilizer, cold sterilization that includes use of enzymes like gluteraldehyde, alcohol or sodium hypochlorite. Venkatakrusumaran et al compared 4 different methods of sterilization of endodontic files and suggested that autoclave sterilized the endodontic instruments completely whereas files placed in glass bead were 90% sterile and in gluteraldehyde they were 80% sterile. Jonhson et al suggested that hot salt, glass bead sterilization methods were effective for working ends of hand files but it was ineffective for completely sterilizing hand files, i.e., plastic handles of the files. In the present survey 60% dentists used autoclave, 41% used glass bead, 2% hot salt sterilizer and 16% used cold sterilization method. Steam sterilization (Autoclave) is the best proven and most commonly used method for sterilization. All the 169 dentists were asked about the number of cases they performed per day. On an average, a majority of dentists performed one to five cases per day. So either the dentist had to purchase multiple endodontic files or had to undergo the process of cleaning and autoclaving after every use. But there is a need of a device that is required and need of separate sterilization room can prohibit the work. This device be used chair-side in between two consecutive appointments. Such a device is needed of the hour in current global dental market. The research for designing such a device is ongoing.

Conclusion
The knowledge of dentists regarding sterilization in Endodontics was found to be adequate, but needed to be upgraded. Also there is a need for a new sterilization device that can enhance the quality of work done by a dental professional. The new device can help the clinician to clean and sterilize all endodontic instruments chair-side within few minutes between appointments. Such a device is the need of the hour in current global dental market.

Advantages of the device:
- Less time consuming
- No corrosion (as no moist heat)
- Portable & Compact
- Cleaning and sterilization both procedures provided in one single compact device
- Easy to use
- Can be used chair-side
- Can be used in-between two consecutive appointments

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Mention
Anyone interested in dealership or purchase of the said device should contact Dr Nomalshah via drnomalshah@gmail.com

Note: All the intellectual property rights are reserved. The study and design of the device are already patented.

References