

## ORIGINAL ARTICLE

### KNOWLEDGE AND ATTITUDE OF ENDODONTIC UNDERGRADUATE STUDENTS TOWARD STERILIZATION OF ENDODONTIC FILES: A CROSS-SECTIONAL STUDY

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#### ABSTRACT:

**Background:** Considering the enormity of the challenge that infectious agents pose the implementation of effective sterilization protocol among all healthcare communities including dental office is vital. Among the healthcare workers, dentists have a critical role to play in prevention efforts and they are an important population to study their level of knowledge, attitudes, and behavior regarding disinfection. So, we planned this study to assess the attitude and knowledge of endodontic Undergraduate students toward sterilization of endodontic files. **Materials and method:** The study was conducted in Department of Conservative Dentistry and Endodontics of the institution. All the UG from Department of Conservative Dentistry and Endodontics were included in the study. Overall, 100 students participated in the study, among which 63 were females and 37 were males. Face-to-face interview was conducted and the data collected were entered in a prescribed format. **Results:** In knowledge section, 83 students accepted endodontic files need to be sterilized and 21 students reported that endodontic instruments can be used four or more times. To clean the endodontic files, they reported ultrasonic bath (n=35), brushing with soap (n=35), any other (n=22), and chemical solutions (n=8). **Conclusion:** Despite the availability of knowledge and extremely positive attitude towards the utility of guidelines and protocols for sterilization of endodontic files, practice is not coherent with sterilizing endodontic files.

**Keywords:** Endodontist, rotary, files, ultrasonic

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#### INTRODUCTION:

The evidence of occupational potential for disease transmission can be estimated by the evidence of numerous types of harmful microbial pathogens isolated from the oral secretions. The risk of cross infection and transmission of disease from one patient to another is highly increased in case of dental healthcare practitioners.<sup>1</sup> 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, human immunodeficiency virus and herpes.<sup>2</sup> Endodontic treatment involves cleaning and shaping of the root canals as an important phase. 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.<sup>3,4</sup> In the absence of adequate infection control procedures, there is a realistic potential to transmit pathogenic microbes via endodontic instruments. These pathogenic microbes may be sourced from within the root canal or from the periradicular tissues. During the cleaning and shaping of the root canal, residual organic and inorganic material accumulates on the working sections of files from one

patient to another is substantial because they can act as antigens, infectious agents, or nonspecific irritants.<sup>5</sup>

The complex, miniature architecture of endodontic files makes the precleaning and sterilization difficult. Devising a sterilization protocol for endodontic files requires care.<sup>6</sup>

Sterilization plays a very important role in the prevention of cross infection.<sup>7</sup> There is general agreement that the presence of debris may interfere with sterilization by forming a protective barrier that prevents the complete sterilization of the surface beneath. Hence, if bioburden is not removed then any sterilization procedure may be futile. The risk of infection is greater for the endodontist and his staff than for the patients. The cleaning of instruments to remove microorganisms and biological debris effectively eliminates the majority of microorganisms.<sup>8</sup> As endodontic files have no internal surfaces that cannot be reached, it would be expected that a cleaning protocol could be developed that results in files free of bioburden.<sup>2,3</sup>

Different types of methods have been proposed for the cleaning and sterilizing the endodontic files including use of sponges and brushes, ultrasonic cleaning, glutaraldehyde solution, sodium hypochlorite, glass bead sterilizer, dry heat and also use of steam sterilizer with or without use of the chemicals. Cleaning the hand instruments with

ultrasonic cleaner has been found to be superior to the other methods of cleansing and debriding<sup>3,4</sup>. Considering the enormity of the challenge that infectious agents pose the implementation of effective sterilization protocol among all healthcare communities including dental office is vital. Among the healthcare workers, dentists have a critical role to play in prevention efforts and they are an important population to study their level of knowledge, attitudes, and behavior regarding disinfection.<sup>9</sup> So, we planned this study to assess the attitude and knowledge of endodontic Undergraduate students toward sterilization of endodontic files.

**MATERIALS AND METHODS:**

The study was conducted in Department of Conservative Dentistry and Endodontics in the institution. All the UG from Department of Conservative Dentistry and Endodontics were included in the study. Overall, 100 students participated in the study, among which 63 were females and 37 were males. All the PG's were informed about the research and a verbal consent was obtained. No personal information was gathered. Face-to-face interview was conducted and the data collected were entered in a prescribed format. Privacy was guaranteed and the individual results were kept confidential.

Three sections were made in the questionnaire:

- Knowledge about standard sterilization protocols of endodontic files
- Attitude towards the utility of guidelines/protocols perception of sterilization in the success of root canal treatment
- How these sterilization protocols are precisely practiced.

Majority of the questions were close ended. Ethical clearance from the ethical committee of the institute was taken for the study. The data obtained was subjected for statistical analysis. Statistical significance of data was

checked using SPSS software for windows. Statistical significance was considered as P<0.05.

**RESULTS:**

Overall, 100 students participated in the study, among which 63 were females and 37 were males. In knowledge section, 83 students accepted endodontic files need to be sterilized and 21 students reported that endodontic instruments can be used four or more times. To clean the endodontic files, they reported ultrasonic bath (n=35), brushing with soap (n=35), any other (n=22), and chemical solutions (n=8). For sterilization, 63 students said autoclave and 28 students said glass bead sterilization. All of the UG students (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. Of the 100 students 72 of the participants believed that sterilizing instruments will not consume much time. Interestingly, 69 students reported that dental assistants are not trained for sterilization protocols and 31 with no dental assistants itself.

In practice, 42 students used same endodontic files for four or more times and 46 students used three times per day; whereas, 33 students reported that two sets of files were used per day. Even though majority perceived the importance of sterilization, 63 students said they will not sterilize new endodontic files before use and 14 students reuse.

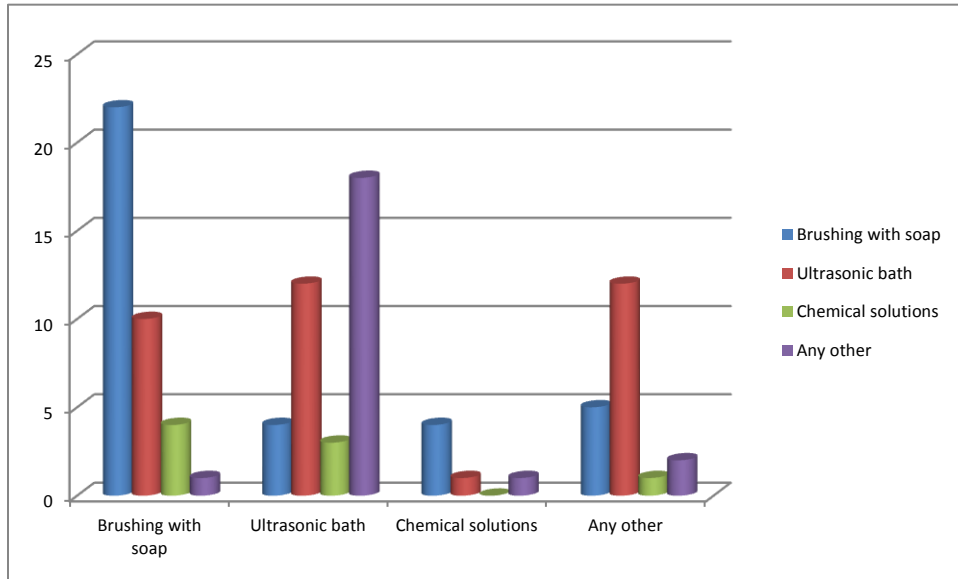
In practice, the method of cleaning was brushing with soap (35 students), ultrasonic bath (35 students), and chemical solution (8 students). This difference in knowledge and practice is statistically significant (Table 1 and Figure 1). In addition, 63 students reported using autoclave and 28 students using glass bead sterilizer for sterilizing endodontic instruments. This difference observed between knowledge and practice is statistically highly significant (Table 2 and Figure 2). P value less than 0.05 was considered statistically significant.

**Table 1:** Comparison of knowledge and practice for method of cleaning

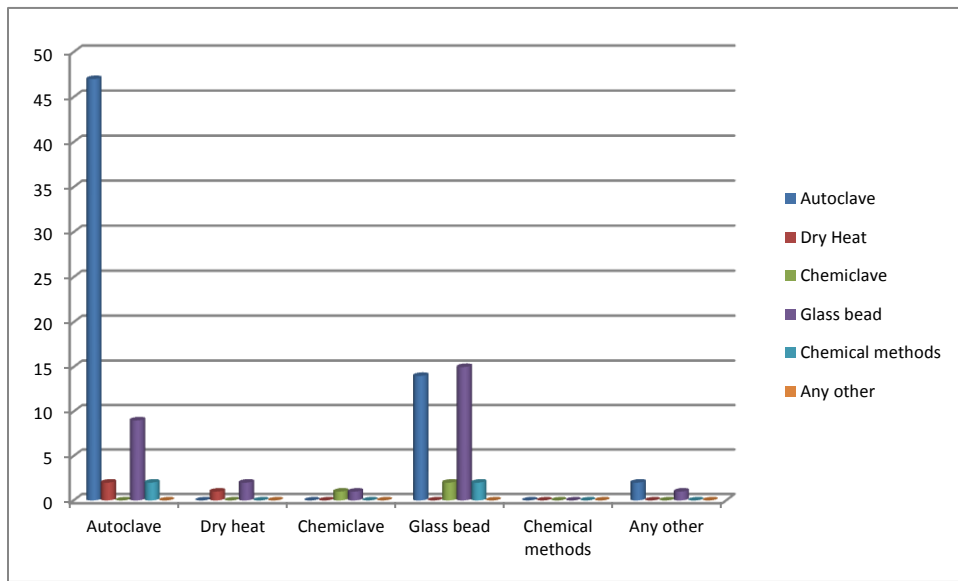
How to clean endodontic files (knowledge)	Methods practiced to clean endodontic files (practice)				Total
	Brushing with soap	Ultrasonic bath	Chemical solutions	Any other	
Brushing with soap	22	4	4	5	35
Ultrasonic bath	10	12	1	12	35
Chemical solutions	4	3	0	1	8
Any other	1	18	1	2	22
<b>Total</b>	<b>37</b>	<b>37</b>	<b>6</b>	<b>20</b>	<b>100</b>

**Table 2:** Knowledge and practice for methods of sterilization comparison

Methods used for sterilization(knowledge)	Methods used for sterilization(knowledge)						Total
	Autoclave	Dry heat	Chemoclave	Glass bead	Chemical methods	Any other	
Autoclave	47	0	0	14	0	2	63
Dry Heat	2	1	0	0	0	0	2
Chemoclave	0	0	1	2	0	0	3
Glass bead	9	2	1	15	0	1	28
Chemical methods	2	0	0	2	0	0	4
Any other	0	0	0	0	0	0	0
<b>Total</b>	<b>60</b>	<b>3</b>	<b>2</b>	<b>32</b>	<b>0</b>	<b>3</b>	<b>100</b>



**Figure 1:** Comparison of knowledge and practice for methods of cleaning



**Figure 2:** Comparison of knowledge and practice for methods of sterilization

**DISCUSSION:**

Infection control is consisted of various actions to prevent further spread of infections. Important issue is that they should be simple, practical and understandable and could be easily done by dental assistant.<sup>10</sup> Sterilization is a process to render an object free from viable organisms including bacterial spores and viruses. So, sterilization is an “all-or-none” phenomenon.<sup>3</sup> 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 material.<sup>7</sup>

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 prepared and disinfected before use.<sup>1</sup>

While doing root canal treatment this type of cross infection can occur through endodontic instrumentation like endodontic files. These files often become coated with vital and necrotic tissue, dentin chips, bacteria, blood

by products or other types of potential irritants. These heavily contaminated or soiled instruments may present a challenge to all practical methods of disinfection or sterilization.<sup>8</sup> Due to the design of the endodontic files; it is very conducive for the microorganisms and debris to be anchored into them.<sup>3</sup>

The data from this study indicated that the current state of student's knowledge related to sterilization of endodontic files was high. As cleaning and sterilizing endodontic instruments is a prerequisite for their reuse, knowledge regarding single use endodontic files was only known by 20%. The present study showed that ultrasonic bath was the most common known method of choice to clean the endodontic files. Similarly, ultrasonic bath method was observed as best method to clean endodontic files in a study after evaluating biological debris<sup>10</sup>, and microbial counts;<sup>11</sup> and in a study where stainless steel and nickel-titanium files were compared for sterilization procedures.<sup>12</sup> In practice, the present study showed 83 students used same endodontic files three or more times per day, this may be due to time constraint, financial barrier to use new set for each patient. Hence, even though majority perceived the importance of sterilization, 88 students said they will not sterilize new endodontic files before use and 21 students will not sterilize before reusing them. This is similar to Askarian et al., who stated in their study a poor adherence to standard sterilization procedures among dental healthcare professionals in Shiraz.<sup>13</sup> The literature knowledge emphasize that only having knowledge of infection control measures and a positive attitude towards them does not ensure adherence to the guidelines.<sup>2</sup> Similarly, in our study we found that although knowledge and attitude towards sterilizing endodontic instruments is high, practice is not coherent with the literature knowledge. The difference obtained regarding knowledge and practice of cleaning and sterilization of the endodontic files is statistically significant. Hence, the findings of the present study marked the importance of training the students and maintaining strict protocol regarding sterilization of endodontic instruments.

The present study showed that the UG students learnt infection control measures from faculty lessons showing increased knowledge, but the practice in the clinical environment reviewing the guidelines should be emphasized. One should abide themselves to the universal guidelines like "Standard infection control and precautions",<sup>14c</sup> American Dental Association Recommendations", and guidelines set by Center for Disease Control and Prevention.<sup>8, 15</sup>

## CONCLUSION:

This can be concluded from the results of the study that despite the availability of knowledge and extremely positive attitude towards the utility of guidelines and protocols for sterilization of endodontic files, practice is not coherent with sterilizing endodontic files. Statistical significant difference was observed regarding knowledge, attitude, and practice of cleaning and sterilization of the endodontic files.

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