



## RESEARCH ARTICLE

### EVALUATION CRITERIA FOR DENTAL BUR SELECTION, ITS USAGE, CLEANSING AND DISPOSAL

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#### ABSTRACT

**Aim:** To compare the criteria for dental bur selection, its usage, cleansing and disposal among undergraduates, postgraduates and clinicians.

**Objective:** The purpose of this study is to evaluate the criteria for bur selection, usage of bur, cleansing and disposal protocol followed by different operator group and to evaluate the need of formulation of guidelines regarding dental bur selection, its use, cleansing and disposal for standardisation of choice, applicability and to avoid misuse.

**Methodology:** The study involves a questionnaire survey conducted among the undergraduates, postgraduates and clinicians of Nagpur.

**Results:** Data from the questionnaires were analyzed using SPSS 16 software. The results were analyzed statistically and were represented in the percentage form. ANOVA revealed significant differences ( $P < 0.0001$ ) in opinion among the three groups operators

**Conclusion:** The present survey will enable to understand the protocol for handling of the dental burs in routine practice.

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## INTRODUCTION

After conservation of carious tooth by endodontic treatment, coronal coverage is the ideally followed protocol to maintain the tooth integrity in the oral cavity. The desired tooth form for coronal coverage is achieved during tooth preparation. As during tooth preparation, the removal and shaping of tooth structure is very important aspect and it is achieved by dental burs. The complex miniature architecture of dental bur makes pre-cleaning and sterilization difficult (Morrison, 2009 and Whitworth, 2004). Devising a sterilization protocol for dental bur requires care. Dental burs are a source of microbial contamination as a result of their contact with saliva, blood, and carious teeth (Schutt, 1990). Transmission of infection primarily occurs in horizontal mode among dentist and patients<sup>3</sup>. Dental bur comes in a variety of shapes and sizes, all with very complex and detailed surface features. As dental burs are composed of steel, alloys, or tungsten-carbide; steam in an autoclave has the disadvantage of rusting, corroding, and clogging of the cutting edges (Schutt, 1990). The present survey will enable to understand the protocol for handling of the dental burs in routine dental practice.

## MATERIALS AND METHODS

This cross-sectional study was conducted from 2017-2018. The target population was the undergraduate student, postgraduate students of Swargiya Dadasaheb Kalmegh Smruti Dental College, Nagpur and general practicing dentists of Nagpur.

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A total of approximately 20 questions were framed and each question having multiple choice options as answers. The questionnaire proforma was divided into four sections and each section was having questions pertaining to that topic. The four sections were selected as selection, usage, cleansing and disposal. This questionnaire was sent to 60 undergraduates, 60 postgraduates and 60 clinicians. Data from the questionnaires was analyzed using SPSS 16 software. The results were analyzed statistically and represented in the percentage form. In the selection category, questions were framed which aimed at evaluating the criteria for selection of dental bur, awareness about colour code and sequence of colour code followed, awareness about cutting efficiency of variety of burs. In the usage category, questions were framed which aimed on duration of usage of bur, choice of bur used for incorporation of depth grooves, for initial tooth reduction and final finish of the prepared tooth crown removal, for reducing highpoint. In the cleansing category, questions were framed on the various cleansing protocol for clogged burs and what is the operators preferred method of sterilization, its frequency and awareness about bur brush and anticorrosion dips. In the disposal category, questions were framed on criteria followed for bur disposal, color coding of biomedical waste, disposal of burs used in HIV and HBV patients.

## RESULTS

A total 180 participants answered the questions, a response rate of 100%. The data was represented graphically and the frequency was represented in terms of percentage. The data is discussed as follows [Table/Fig. 1 & 4]

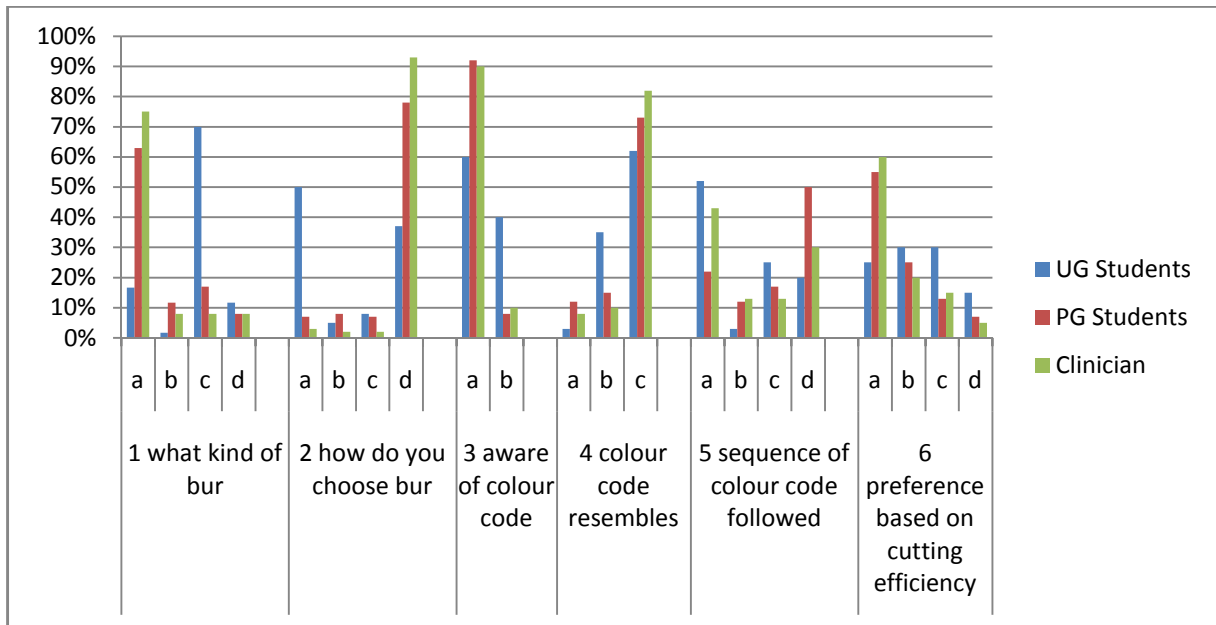


Figure 1. Select criteria

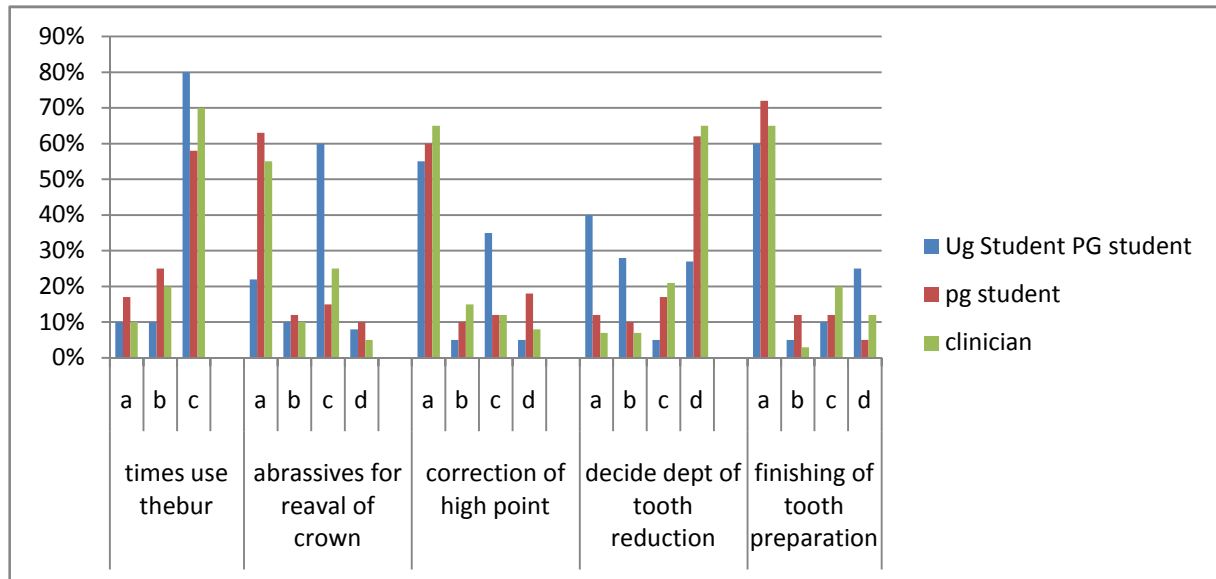


Figure 2. Usage criteria

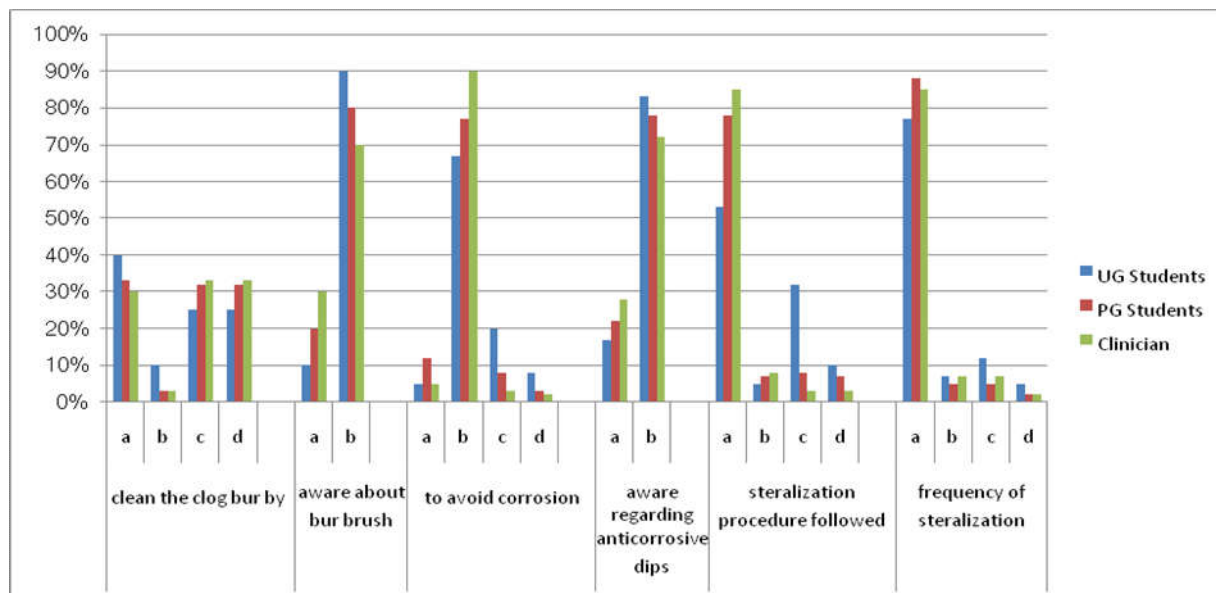


Figure 3. Selection category

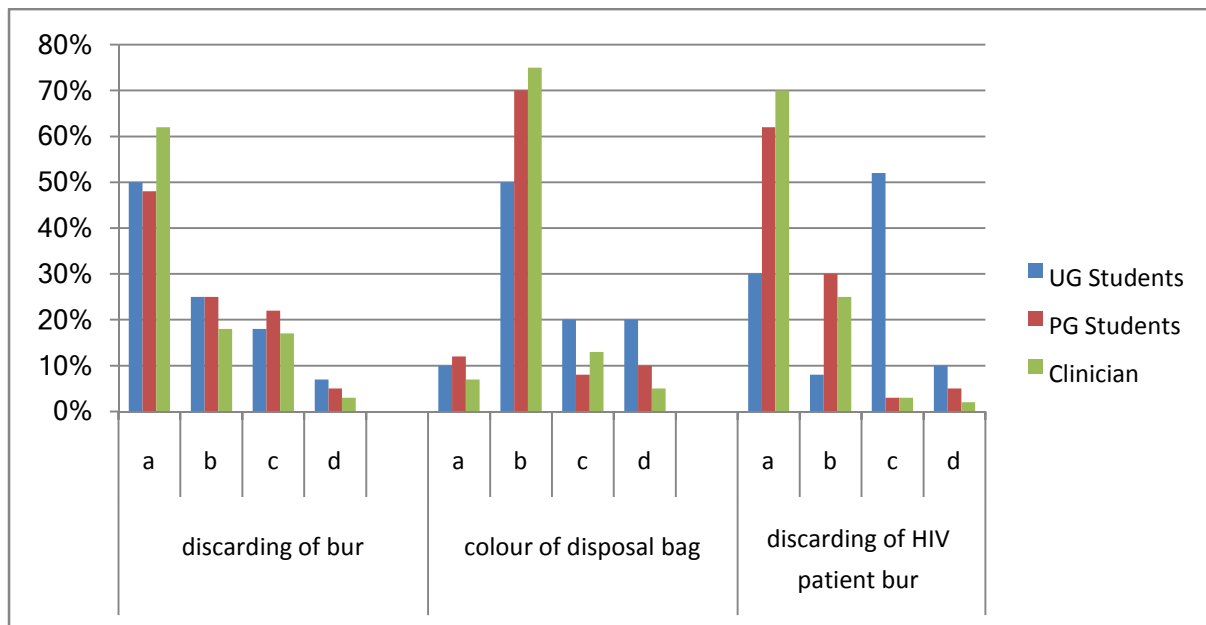


Figure 4. Disposal category

## DISCUSSION

Prevalence of dental caries, its conservation and coronal coverage is the ideal recommended protocol followed. Tooth preparation helps in creating a desired form to the tooth for its coronal coverage. And the desired form is achieved by dental bur. The purpose of present survey was to study the criteria followed for dental bur selection, its usage, cleansing and disposal protocol followed by undergraduate, post graduate and clinicians. Bur selection is probably based on several factors: tradition, shape, clinical procedure being done, substrate being cut, their method of sterilization and disposal (Siegel, 1999). Rationale for bur selection and its application is not addressed in the literature or in standard operative and prosthodontics texts.

Moreover, this selection is complicated by its availability in different sizes and coarseness of bur (International Journal of Current Research, 2017). In our survey most of the practitioner affinity towards the diamond burs followed by the tungsten carbide burs for tooth reduction. During grinding debris accumulates on the surface of the bur which would decrease the cutting efficiency because this partially blocks the penetration of the abrasive particles into the substrate. In this study most of the practitioners showed a positive affinity towards the diamond abrasives and believed that coarseness is directly related to the cutting efficiency. Dental burs come in a variety of shapes and sizes. This variation is based on type of material and the manufacturing company. This study enables to know the trend followed for bur selection. Also colour coding of bur and its sequence during tooth preparation is important point of concern during bur selection. Also operators choice of bur was evaluated for various steps during preparation like incorporation of depth grooves, final finish of the preparation, bur used for reduction of high points and crown removal. Diseases may be transmitted by indirect contact when dental instruments contaminated by one patient are reused for another patient without adequate disinfection or sterilization. The process of sterilization is designed to render instruments free of microorganism, including bacterial spores, which can be very difficult to kill (International Journal of Current Research, 2017).

Resterilization is simply the repeated application of a sterilization procedure to an instrument or device to remove contamination, allowing for its use in treating multiple patients (International Journal of Current Research, 2017). Type B viral hepatitis and other diseases can be transmitted to dentists, auxiliaries, and patients by way of dental instruments. The transfer of contaminated blood in amounts as small as 0.0001 mL can result in hepatitis (Bvirus Andreas). Cold sterilization is an effective way of rendering the burs free of bacterial contamination (International Journal of Current Research, 2017). Product manufacturers have introduced single use burs as an alternate solution to infection control. However, it will be wise to use single use bur as they not only provide an effective way of sterilization but also good cutting efficiency (International Journal of Current Research, 2017). But single use bur was less preferred option by the participants in this study. During tooth preparation debris accumulates on the surface of the bur which would decrease the cutting efficiency because this partially blocks the abrasive surface of bur. Ultrasonic cleaning can also be an effective and time-saving method of cleaning instruments, although it is not capable for removing all contamination. This technique makes the debris to be removed and prevent clogging (International Journal of Current Research, 2017). Ultrasonic cleaning is much safer than hand-scrubbing because it decreases the risk of puncture wounds (Morrison, 2009).

This mode of cleansing was much preferred by the participants in this study. Also autoclaving corrodes sharp instruments, thereby impeding their cutting efficiency. The most practical approach is to provide a passive surface layer on the bur to reduce the electrochemical potential for corrosion. Anticorrosive dips produce a passive oxide layer that coats the metal, thus protecting it from corrosion<sup>4</sup>. But the results of study show that participants are less aware about the use of anticorrosive dips (Johnson, 1987). It was found that most practitioners dispose worn out burs directly into dustbins but actually these burs should have been sent back for recycling. So, focus should be laid in educating the dentists to recycle old worn out burs (International Journal of Current Research, 2017). Direct disposal without appropriate infection and care may cause health hazard and environmental hazard

too. The study was conducted to evaluate operators knowledge on bur selection, guidelines and recommendations on bur selection for clinical procedure. And the last purpose was to evaluate the mode of infection control and disposal awareness among the practitioners. According to the Centers for Disease Control and Prevention guidelines, to prevent cross-contamination, decontamination of dental burs is necessary in daily routine practice. There are various factors that determine choice of disinfection like toxicity to the patient and/or dentist, any damage to the instrument, cost, stability, the degree of microbial killing required, and ability of disinfectant to kill microorganisms rapidly.

### Conclusion

Variable opinion regarding selection, usage, cleaning, and discarding of dental bur by under graduate student, post graduate students and clinician was obtained. These differences were statistically significant. It is observed that mostly clinicians follow the protocol which they used to follow during undergraduate and postgraduate practice. So awareness should be done at undergraduate level. Study was conducted to evaluate the operators knowledge towards use of dental bur in routine dental practice, which would enable educators to evaluate their recommendations relative to their peers and facilitate evidence based clinical teaching and research. If appropriate sterilization cannot be devised, perhaps the instruments should be considered single-use devices. This would reduce the risk of transmission of all infectious agents, including prions. However, the need of the hour is to formulate the guidelines for bur selection, usage, cleansing and disposal as it not only will standardize the choice, but misuse and applicability will be reduced.

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