

Irrigation Protocol Among Endodontic Faculty and its Post-Graduate Students of all the Dental Colleges in the State of Chhattisgarh, India: A Survey

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ABSTRACT

Aim: The purpose of this study is to determine the methodology in the use of root canal irrigants being practiced among the endodontic faculty & post-graduate students in all the dental colleges of the state of Chhattisgarh, India.

Materials and Methods: Questionnaire was personally given to all the endodontic faculty and post-graduate students of the department of conservative dentistry and endodontics in all the 6 dental colleges in Chhattisgarh, India. A Total 67 participated in the survey and they were asked about their irrigant selection, irrigant concentration and smear layer removal protocol.

Results: Our data indicated that 78% of respondents use sodium hypochlorite as primary endodontic irrigant, 49% of them using it at concentration of 2.6-4.0%, with 26 gauge needle being most preferred for syringe irrigation, 81% of our respondents aim to remove smear layer.

Conclusion: The findings of this survey showed 75% of the respondents in the dental colleges of the state of Chhattisgarh use NaOCl [Sodium hypochlorite] as their primary endodontic irrigant. 81% of the respondents favor for the removal of smear layer and 73% of respondents showed a general trend to modify the irrigation protocol according to the status pulp, status of periapex & retreatment cases.

Keywords: Root canal irrigants, Questionnaire, Survey, Participant, Respondent.

INTRODUCTION

Root canal treatment primarily aims at removing the infected pulp from the root canals of the affected teeth. Its success depends upon the efficiency with which it removes microorganisms from the root canal space. The role of the irrigation protocol thereby plays a key role in the disinfection of the root canal space.¹ The purpose of this survey was to ascertain the current irrigation protocol followed by endodontic faculty and post-graduate

students in all dental colleges of the Chhattisgarh state. This is the first survey of this nature, which is conducted in Chhattisgarh.

MATERIALS AND METHOD

Our survey was based on the survey employed by Dutner et al,² among members of American Association of Endodontists and published in Journal of Endodontics (2012). A modified survey questionnaire was prepared and

Received: Apr. 20, 2016: Accepted: June. 8, 2016

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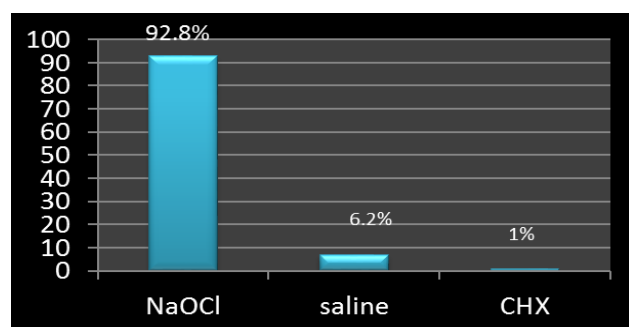
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personally given to all the endodontic faculty and post-graduate students of the department of conservative dentistry and endodontics in all the 6 dental colleges in Chhattishgarh state, India. A Total of 67 participated in the survey and they were asked about their endodontic irrigant selection, irrigant concentration, smear layer removal protocol and use of adjuncts during irrigation. Questions consisting of numeric rankings, multiple choices and multiple selections were included in the survey questionnaire. The data were collected and analyzed using SPSS software version 17. The survey questionnaire which was given to each of the participant is shown in Table I.

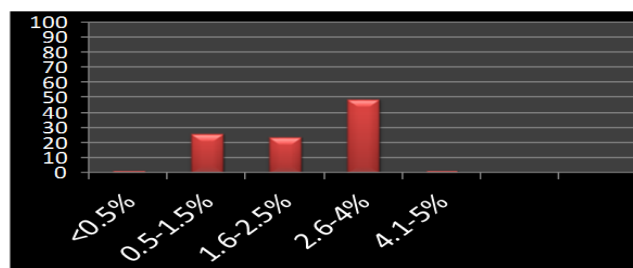
RESULTS

Our survey shows 92.8% of the respondents using NaOCl as primary endodontic irrigant.



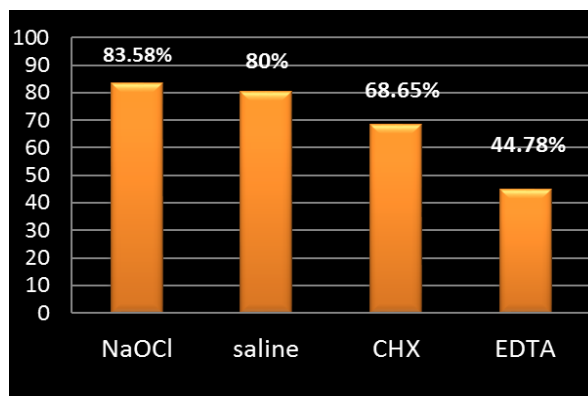
Graph 1: Percentage of respondents using primary irrigant during root canal treatment.

When the respondents were asked to rank the reason for their primary irrigant selection, antibacterial capability was found to be most important, followed by tissue dissolution, biocompatibility, substantivity and of this, 49% of the respondents using 2.6 to 4% concentration of NaOCl.



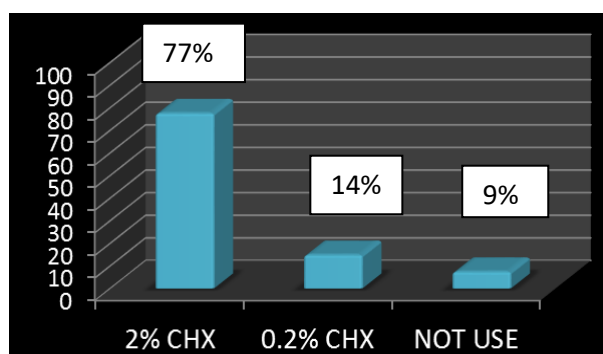
Graph 2: Percentage of respondents using varying concentrations of sodium hypochlorite in their irrigation protocol.

80% of the respondents showed to be using saline, 68.65% of the respondents showed to be using CHX [Chlorhexidine] & 44.78% of the respondents showed to be using EDTA [Ethylenediaminetetraacetic acid] either as primary or secondary root canal irrigants.



Graph 3: Percentage of respondents using either as primary or secondary irrigant during root canal treatment.

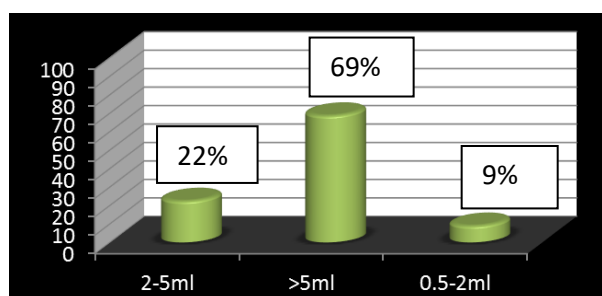
Our survey also shows that 68.5% of the respondents using CHX as an endodontic irrigant, with 77% of the positive respondents using 2%CHX and 14% of the positive respondents using 0.2%CHX as their preferred concentration. 54% of the respondents reported to be using CHX as root canal irrigant for the teeth with radiographic evidence of periapical pathology and 56% of the respondents reported to be using CHX as the preferred irrigant in retreatment cases.



Graph 4: Percentage of respondents using varying concentrations of chlorhexidine during root canal treatment.

69% of the respondents claimed to be using more than 5ml of the root canal irrigant per canal

and 22% of the respondents claimed to be using 2-5ml of the root canal irrigant per canal. 81% of the respondents claimed to remove smear layer during endodontic treatment. 73% of the respondents said to alter their root canal irrigant selection on the basis of pulpal or periapical pathology. 60% of the participants in our survey claimed to insert needle to middle 3rd of the root canal during root canal irrigation. 39% of our survey participants said to be using endosonics as an adjunct during root canal irrigation.



Graph 5: Percentage of respondents utilizing the volume of the irrigant per root canal.

Table 1: Survey questionnaire form.

I) How many years ago did you complete your postgraduate endodontic training?	
a) >30	b) 21-30
c) 11-20	d) 5-10
e) <5	f) Still in training
II) Which irrigants do you use? (Please select all that apply)	
a) Sodium hypochlorite	b) Chlorhexidine
c) Saline	d) 3% H ₂ O ₂
e) EDTA	f) MTAD
g) Other	
III) Which irrigant do you primarily use?	
a) Sodium hypochlorite	b) Chlorhexidine
c) Saline	d) 3% H ₂ O ₂
e) EDTA	f) MTAD
g) Other	
IV) Which concentration of sodium hypochlorite do you primarily use?	
a) <0.5%	b) 0.5-1.5%
c) 1.6-2.5%	d) 2.6-4.0%
e) 4.1-5.0%	f) >5.0%
g) I do not use sodium hypochlorite	
V) Which concentration of Chlorhexidine do you primarily use?	
a) 0.2%	b) 0.12%
c) 2.0%	d) >2.0%
e) I do not use Chlorhexidine	
VI) How much volume irrigant do you use per canal?	
a) <0.5 ml	b) 0.5-2 ml
c) 2-5 ml	d) >5 ml
VII) Rank the reasons for your primary irrigant selection from most important to least important	
a) Antibacterial efficiency	b) Biocompatibility
c) Tissue dissolution	d) Substantivity
e) Cost	
VIII) Do you routinely aim to remove the smear layer?	
a) Yes	b) No
IX) Which of the following irrigants would you primarily utilize when treating a tooth with a vital pulp?	
a) Sodium hypochlorite	b) Chlorhexidine
c) Saline	d) EDTA
e) Other	
X) Which of the following irrigants would you primarily utilize when treating a tooth with radiographic evidence of a periapical lesion?	
a) Sodium hypochlorite	b) Chlorhexidine
c) Saline	d) 3% H ₂ O ₂
e) Other	
XI) Which of the following irrigants would you primarily utilize when treating a previously treated tooth?	
a) Sodium hypochlorite	b) Chlorhexidine
c) Saline	d) Sterile water
e) EDTA	f) Other
XII) Which, if any, adjuncts to irrigation do you utilize? (Please select all that apply)	
a) Ultrasonic activation	b) Sonic activation
c) Subsonic activation	d) Negative pressure
(example: EndoActivator)	(example: EndoVac)
e) Others	
XIII) What is the routine gauge of the needle employed by you during syringe irrigation?	
a) 26 gauge	b) 27 gauge
c) 30 gauge	d) 31 gauge
XIV) How deep you insert needle for irrigation?	
a) coronal 3 rd of canal	b) middle 3 rd of canal
c) apical 3 rd of canal	
XV) What is the final wash that you use before obturation?	
a) 2% chlorhexidine	b) 3% H ₂ O ₂
c) normal saline	d) sodium hypochlorite
e) citric acid	f) distilled water

DISCUSSION

According to Zehnder,³ an ideal root canal irrigant must be non toxic to body tissues, non

irritant to the periapical tissues, must have a broad spectrum of antimicrobial activity, to dissolve smear layer and should inactivate the toxins released by microbes. As of date, sodium hypochlorite (NaOCl) has been able to meet most of these criteria. It has a broad antibacterial spectrum while also possessing some ability to inactivate bacterial endotoxins.^{4,5,6} NaOCl also dissolves pulpal remnants and collagen. In spite of its unpleasant taste, toxicity and inability to completely remove the smear layer, NaOCl remains the recommended root canal irrigant of choice.⁷ Adjuncts to irrigation such as endosonic, ultrasonic and subsonic activation have been introduced in endodontics in an effort to improve the delivery and efficacy of irrigants to the apical third of the root canal to improve the canal cleanliness.

In our survey, 92.8% of the respondents claimed to be using NaOCl as the primary root canal irrigant. Where as 91% of the respondents in the American survey II (2012)² and 94% in the Australian survey (2003)⁸ also reported using NaOCl as their primary endodontic irrigant, while 33.6% of the respondents selected to be using hydrogen peroxide as their primary root canal irrigant in the North Jordan survey (2004).⁹ Our survey shows that 49.3% of respondents claimed to be using 2.6 to 4.0% NaOCl as root canal irrigant. Where as 57% of the respondents claimed to using 5% NaOCl in American survey II (2012)² and 1% NaOCl was the preferred concentration used as reported in the Australian survey⁸ conducted in 2003.

The American survey I (2001)¹⁰ showed that 51% of respondents removes smear layer before obturation of the root canal space and the American survey II(2012)² showed that 77% of respondents removes smear layer before obturation of the root canal space. And in our survey, 81% of respondents claim to remove smear layer and in our survey the highest ranked reasons for irrigant selection, is its antibacterial and tissue-dissolving capabilities. It was found that 49.9% of the respondents use more than 5-10 ml of irrigant per canal during the shaping and cleaning procedure.

In our survey 60% of respondents showed to be using 26 gauge needle during syringe irrigation, where as according to Juliane et al, 30

gauge needle was most commonly used for root canal irrigation.¹¹ In our study, 78% of respondents showed that their choice of irrigant change on the basis of pulpal and periapical pathology. 79% of respondents reported to use NaOCl as their primary endodontic irrigant for teeth with vital pulp. 54% of respondents reported to use CHX as primary endodontic irrigant for teeth with radiographic evidence of periapical pathology. Where as, in the American survey II², 66% of the respondents reported they do not alter the irrigant based on the condition of the pulp and periapical pathology. 68% of respondents in our survey reported to be using 2% CHX as the final wash before obturation and Kandaswamy et al also reported that 2% CHX was the best irrigant to be used as final wash before obturation.¹²

CONCLUSION

The findings of this survey shows 92.8% of endodontic faculty and its post-graduate students in all the dental colleges of the state of Chhattisgarh, India, are employing 2.6 to 4.0% NaOCl as their primary endodontic irrigant, 81% of the participants follow the concept of smear layer removal during their endodontic treatment, 78% of the participants modify their irrigation protocol according to the status of the pulp, periapical pathology and in retreatment cases.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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