

## ORIGINAL ARTICLE

# Assessment of Irrigation Practice among Dentists in South India

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## ABSTRACT

**Introduction:** The success of endodontic treatment depends primarily on the eradication of microorganisms from the root canal system and prevention of their reinfection.

**Materials and Methods:** A self-prepared questionnaire was electronically mailed to randomly selected 150 dentists of Bengaluru. The questionnaire was made up of 12 questions with multiple-choice answers covering all the aspects of irrigation protocol in endodontics.

**Results:** Most frequently used irrigants are combination of sodium hypochlorite, saline, and chlorhexidine. The concentration of sodium hypochlorite most preferred is 2.6–4%.

**Conclusions:** Sodium hypochlorite is the most commonly used and preferred solution. The choice of irrigant also varies according to nature of lesion.

**Keywords:** Dental practitioners, Irrigation, Sodium hypochlorite.

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## INTRODUCTION

The success of endodontic treatment depends primarily on the eradication of microorganisms from the root canal system and prevention of their reinfection. The root canal system is shaped with the help of stainless steel and nickel-titanium instruments. This shaping process is accomplished in conjunction with constant irrigation to remove the inflamed and necrotic tissue, microbes/biofilms, and other debris from the root canal space.<sup>[1]</sup> Despite the advent of numerous modern techniques and instruments in canal shaping, more than 35% of the root canal's surface can be left uninstrumented after non-surgical root canal treatment.<sup>[2]</sup> The presence of necrotic or vital

tissue remnants within the root canal space may provide a source of nutrition for the surviving bacteria.<sup>[3]</sup> Thus, microorganisms, either remaining in the root canal space after treatment or those recolonizing the filled canal system, are the main etiological causes of endodontic failures. The role of the irrigation protocol thereby plays a key role in the disinfection of the root canal space. The ideal root canal irrigant has been described by Zehnder<sup>[4]</sup> as being systemically non-toxic, non-caustic to periodontal tissues, having little potential to cause an anaphylactic reaction, possessing a broad antimicrobial spectrum, capable of dissolving necrotic pulp tissue, inactivating endotoxins, and either preventing the formation of a smear layer or dissolving it once it has formed. Although many kinds of endodontic irrigants have been investigated, none have been able to exhibit all the above-mentioned properties. 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 endotoxins.<sup>[5-7]</sup> 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 irrigant of choice.<sup>[8]</sup> The endodontic irrigant with antibacterial activity is 2% chlorhexidine (CHX) because of its substantivity.<sup>[9]</sup> Ethylenediaminetetraacetic acid (EDTA) is a chelating agent that is employed as a root canal irrigant. It helps in removing the inorganic component of the smear layer.<sup>[10]</sup> The other recently introduced irrigant is MTAD, a mixture of doxycycline, citric acid, and Tween 80 detergent. This irrigant has shown its ability in removing the components of smear layer.<sup>[11]</sup> Adjuncts to irrigation such as sonic, ultrasonic, and subsonic activation have been introduced in an effort to improve the delivery and efficacy of irrigants to the apical third to improve the canal cleanliness. Irrigant contact with the surfaces of the root canals can be enhanced using systems such as EndoVac<sup>[12]</sup> (Discus Dental, Culver City, CA). Passive ultrasonic irrigation and EndoVac are more effective in delivering the irrigant to the working length than conventional endodontic needles in root canals.<sup>[13]</sup> The current evidence suggests that sonic and ultrasonic irrigation results in better removal of debris and smear layer from the apical third of the root.<sup>[14,15]</sup> Hence, the present study was conducted to ascertain the current trends in irrigation among dentist in South India.

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## MATERIALS AND METHODS

A self-prepared questionnaire was electronically mailed to randomly selected 150 dentists of Bengaluru. The questionnaire was made up of 12 questions with multiple-choice answers covering all the aspects of irrigation protocol in endodontics. The questions were so framed to cover all the information regarding irrigation, ranging from irrigant selection, irrigant concentration, and smear layer removal, to use of adjuncts to irrigation. Questions consisted of numeric rankings, multiple choices, and multiple selections with options for write-in answers where appropriate. The data were compiled by a single assessor and analyzed using the statistical software SPSS. Blank or multiple answers were all treated as missing values; only single unequivocal replies were included in calculating frequencies and percentages.

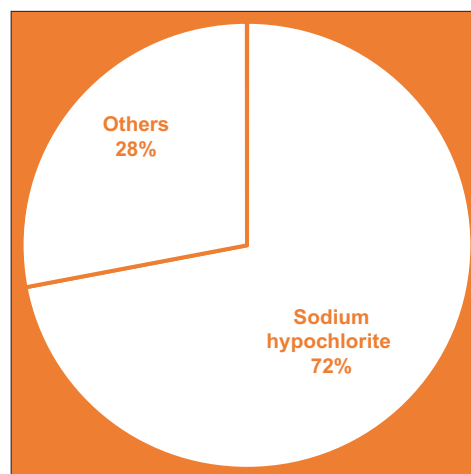
## RESULTS

Most frequently used irrigant is sodium hypochlorite. The concentration of sodium hypochlorite most preferred is 2.6–4% [Figure 1]. Sodium hypochlorite is ordinarily used at room temperature. Usually, sodium hypochlorite was used in combination with other irrigants. The choice of irrigants depended on pulpal involvement. The use of irrigants varies in different clinical situations.

1. Vital tooth sodium hypochlorite
2. Necrotic tooth combination of sodium hypochlorite, saline chlorhexidine, and EDTA
3. Immature tooth saline
4. A tooth with periapical lesion combination of sodium hypochlorite and saline
5. Retreatment cases combination of sodium hypochlorite, saline, and EDTA

## DISCUSSION

In this study, it was found that the majority of respondents (72%) use sodium hypochlorite as their primary irrigant, with most of them (58%) using a concentration of 2.6–4%. The probable reason for the popularity of NaOCl may be attributed to its high tissue dissolving capacity and antibacterial property as latter was found to be the highest ranked reason for the irrigant selection in the study. The results were, however, not comparable to a survey conducted in Australia which reported that 94% of endodontists used sodium hypochlorite, with 80% of those surveyed using a 1% NaOCl solution.<sup>[16]</sup> At the same time, the use of chief irrigants with good substantivity like chlorhexidine was found to be low among the respondents. The earlier studies by Torabinejad recommend the use of chlorhexidine as root canal irrigant, especially in the cases of retreatment and failures which have increased in the past.<sup>[17,18]</sup>



**Figure 1:** Percentage of dental practitioners using sodium hypochlorite as primary irrigant

A majority (70%) of respondents in our study stated that their choice of irrigant does not change on the basis of pulpal and periapical diagnosis. A very few (9%) were found preferring irrigants like metronidazole for teeth with necrotic pulps. This finding might be a significant reason behind the failure of root canal treatment experienced by dental practitioner in their respective practices. These answers should be interpreted with caution because the questions were not open ended and did not allow protocols with multiple irrigants to be considered.<sup>[4]</sup>

When asked about adjuncts used for irrigation, participants were given choices including ultrasonic activation, sonic activation, and negative pressure. Participants also had the option to write in an adjunct. In our study, a very disappointing percentage of only 4% of respondents was found using any kind of adjunct to irrigation with no one using negative pressure irrigation systems. These results indicate a very high need to introduce such systems at reasonably lower cost to make the same popular among practitioners.

## CONCLUSIONS

Sodium hypochlorite is the most commonly used and preferred solution. The choice of irrigant also varies according to nature of lesion. Sodium hypochlorite is also used in various concentrations and in conjugation with other irrigants. Sodium hypochlorite has been used with different adjuncts at different temperature in different clinical situations.

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