

## ORIGINAL RESEARCH

# Survey of Attitudes, Materials and Methods Employed in Root Canal Treatment by General Dental Practitioners in Kathmandu

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## ABSTRACT

**Introduction:** In Kathmandu, the majority of endodontic treatment service is provided by general dental practitioners. The objective of the study was to investigate methods, materials, and attitudes employed during root canal therapy performed by the general dental practitioners in Kathmandu valley so as to evaluate the quality of present practice.

**Material and Method:** The survey questionnaires were distributed among 150 general dental practitioners of Kathmandu, working in various government hospital, recognized private hospital, private clinics and dental colleges. Data was collected and simple descriptive statistical analysis was performed.

**Result:** Out of 150, 132 completely answered questionnaires were received and were included in the study. The survey showed that majority of general dental practitioners (95.4%) did not use rubber dam for isolation during root canal therapy.

For working length determination 45.45% used tactile method along with radiographic method. 32.57% used only radiographic method for determination of working length. 21.21% of practitioners followed combination of radiographic method and apex locator. Very few dentists (5.30%) were seen using only apex locator which is considered to be more reliable.

The step back technique was found to be more popular among the dentists (70.4%) for cleaning and shaping followed by stepdown technique (20.4%) and Filing (push and pull) technique (20.4%). Stainless steel hand file was used by large number of participants (93.9%) whereas nickel titanium hand file and rotary nickel titanium file were used by 34.8% and 9.8% of the participants respectively.

Sodium hypochlorite in 0.5% concentration and calcium hydroxide were the most common irrigation solution and intra-canal medication respectively among the practitioners.

Majority of general dental practitioners (94.7%) used lateral condensation technique for obturation of root canal space.

Most of the practitioners (64.39%) used zinc oxide eugenol as root canal sealer. 36.36% used endomethasone, 19.7% used resin based cement, 4.55% used sealapex, 2.27% used glass ionomer cement and 1.52% used other cements.

Referral of difficult root canal cases to specialist was observed among 61.3% of general dental practitioners.

**Conclusion:** The study shows that the standard guidelines and recent technologies for endodontic treatments are not employed by many general dental practitioners in Kathmandu and they require continuing dental education to update their knowledge.

**Keywords:** General practitioners, Kathmandu, root canal treatment.

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## INTRODUCTION

Root canal treatment is considered as one of the most complex and skilled dental procedures carried out. Modern endodontic often includes the introduction of numerous newer instruments, materials and techniques. Several factors such as root canal fillings, coronal restorations, dentists' knowledge, attitude and skills are related to outcome of root canal treatment to maintain the quality of the treatment.<sup>1</sup>

Various studies showed a varying degree of success of endodontic treatment with some studies showing success rate as high as 96% while others showed as low as 60%.<sup>1-4</sup>

Prior to recognition of endodontic as a specialty, root canal treatment was part of general dental practice in Nepal. It was only after 1987 endodontic was established as a specialty which brought significant changes in the field of endodontic. Nevertheless, Nepal Medical Council record shows there are only 39 endodontists registered in Nepal till date.

Root canal treatment is highly prevalent in dental practice in Kathmandu and the demand for the treatment is not met by small number of specialists. The lack of sufficient specialist has resulted in general dental practitioners taking responsibility to fulfill the need of root canal treatment.

As the quality of root canal treatment is influenced by in-

dividual general dental practitioner's attitude, methods and materials used in the treatment, the purpose of this study is to evaluate the quality of present practice in Kathmandu.

## MATERIAL AND METHOD

In order to evaluate the quality of present endodontic practice in Kathmandu, a cross sectional study was carried out from August to November 2014. The study assessed the methods, materials and attitudes employed in Root Canal Treatment by general practitioners in Kathmandu, Nepal.

Ethical approval was taken from the institutional review committee of College of Medical Science and Teaching Hospital, Bharatpur. Permission was granted by the committee to conduct the study in Kathmandu.

The survey questionnaire was developed based on previous studies and items related to routine endodontic practice. The questions concerned:

1. Gender and years of professional experience
2. Use of rubber dam, choice of method to determining working length, choice of instruments and root canal preparation technique.
3. Choice of root canal irrigants, concentration of sodium hypochlorite used and the types of intracanal medication.
4. Choice of obturation technique and sealer
5. Attitude toward referral to specialist and cause of referral.

Prior to the data collection, the questionnaire was pretested for clarity and reliability. The survey questionnaires were distributed among 150 general dental practitioners of Kathmandu, working in various government hospital, recognized private hospital, private clinics and dental colleges. A high response rate of 88% was achieved with 132 completely answered questionnaires out of 150 distributed.

## STATISTICAL ANALYSIS

Statistical analysis software SPSS version 16 was used for simple descriptive analysis of the collected data; frequency and percentage distribution were calculated.

## RESULT

Out of total 132 participated general dental practitioners, 85.6% were females and 14.4% were males.

The first group (0–5 years) consisted of more than half the total respondents, while second (6-10 years) and third ( 11-20 years ) groups comprise 15.9% and 5.3% respectively (table 1).

The survey showed that majority of general dental practitioners (95.45%) did not use rubber dam for isolation during root canal therapy. Very few participants (4.55%) used rubber dam.

Also, This study revealed that 83.33% of the practitioners

preferred taking preoperative radiographs. For working length determination 45.45% used tactile method along with radiographic method. 32.57% used only radiographic method for determination of working length. 21.21% of practitioners followed combination of radiographic method and apex locator. Very few dentists (5.30%) were seen using only apex locator.

The step back technique was found to be more popular among general dentists with 70.45% using the technique. Followed by stepdown technique (20.45%) and Filing (push and pull) technique (20.45%).

Stainless steel hand file was used by a large number of practitioners (93.9%) whereas nickel titanium hand files and rotary nickel titanium files were used by 34.8% and 9.8% of the participants respectively (table 2).

Sodium hypochlorite was the first choice of root canal irrigant (98.48%), followed by normal saline (65.91%), EDTA (50%), hydrogen peroxide (47.73%) with use of other irrigants considerably low compared to the above mentioned.

The most commonly used concentration of sodium hypochlorite was 0.5%, which was used by 47.72% of the gen-

Use of rubber dam	Frequency	Percentage
Yes	6	4.55
No	126	95.45

**Table-1:** Use of rubber dam for root canal procedure.

Irrigant	Frequency	Percentage
Sodium hypochlorite	130	98.48
EDTA	66	50.00
MTAD	12	9.09
Local anesthetic solution	12	9.09
Normal saline	87	65.91
Hydrogen peroxide	63	47.73
Chlorhexidine Digluconate	23	17.42

**Table-2:** Use of root canal irrigant

Intracanal medicament	Frequency	Percentage
Calcium hydroxide	127	96.21
Chlorhexidine digluconate	16	12.12
Formaldehyde	25	18.94
Tricresol formalin	3	2.27
Dexamethasone	10	7.58
Iodoform	11	8.33
CMCP	7	5.30
Polyantibiotic paste	52	39.39
Eugenol	24	18.18
Other	1	0.76

**Table-3:** Use of intracanal medicament

Method	Frequency	Percentage
Single cone	29	21.97
Lateral condensation	125	94.70
Vertical condensation	14	10.61
Cement only	1	0.76

**Table-4:** Method of obturation

eral dental practitioners (table 3). Besides root canal irrigant, calcium hydroxide was more widespread as an interappointment medicament amongst practitioners (96.21%) (table 4). With 94.7%, lateral condensation was the most popular obturation technique among general dental practitioners, followed by single cone (21.97%) and vertical condensation (10.61%). Merely one (0.76%) practitioner was found to use cement only for obturation of root canal system. Most of the practitioners (64.39%) used zinc oxide eugenol as root canal sealer. 36.36% used endomethasone, 19.7% used resin based cement, 4.55% used sealapex, 2.27% used glass ionomer cement and 1.52% used other cements. 61.36% of general dental practitioners referred root canal cases to specialists.

## DISCUSSION

The response rate to questionnaire was high (88%) which is higher than other studies. Majority of practitioners had experience of 0-5 years, this could be due to the noticeable increase in the number of graduates in recent years.

Vast majority of the respondents did not use rubber dam for isolation during root canal treatment. This observation is in agreement with the other studies.<sup>5,6,7</sup> The reasons for not using rubber dam could be additional cost, extra time, absence of patient's acceptability, inadequate skills or training. Application of rubber dam in endodontic treatment is standard care to provide an infection control barrier thereby reducing the bacterial contamination of root canal system. The efficiency of treatment during root canal treatment is seen to improved by use of it.<sup>8,9</sup>

As working area is protectively shield by use of rubber dam, it may avoid general dental practitioners from facing medico-legal problem due to inhalation and swallowing of dental materials, fine instruments, tooth fragments and irrigants into the patient's oropharynx.

Furthermore, the choice of root canal irrigant and its concentration are also strongly dependant upon the application of rubber dam during endodontic treatment. For accurate diagnosis and preoperative consideration of potentially complicated cases, high-quality radiographs had been recommended,<sup>10</sup> The current study revealed that (83.33%) of the practitioners preferred taking preoperative radiographs which is similar to a study done in Karachi.<sup>11</sup>

It is essential to establish accurate length of canal(s) for thorough cleaning and shaping of the root canal system so as to eradicate bacteria and any organic tissue that may act as a substrate for further bacterial proliferation.<sup>12</sup>

The most commonly accepted technique used for establishing working length has been radiographs. In the present study, tactile method along with radiographic method was the method of working length estimation preferred by most respondents (45.45%) followed by only radiographic method (32.57%). Moreover modern electronic apex locators can give more accurate result, which has been used by 5.3% den-

tists in present study. However it can be used in conjunction with radiographs because additional information about tooth anatomy can be provided by radiograph.<sup>3</sup> In this study 21.21% of practitioners used radiography in conjunction with an electronic apex locator.

Stainless steel hand files were used by 93.94% of the practitioners while only 34.85% and 9.85% used hand and rotary Ni-Ti files respectively. Similarly, use of stainless steel hand files was more common among majority of practitioners in previous studies.<sup>13,14</sup> Several studies have revealed the superiority of nickel titanium files over conventional stainless steel instruments to shape the root canal system.<sup>15-17</sup> Yet, all clinical cases cannot be resolved by use of hand and rotary nickel titanium files therefore the use of hand stainless steel hand file is unavoidable.

Regarding the technique of shaping the root canal, crown-down technique provides various benefits like early removal of majority of microorganisms and pulpal tissues during cleaning and shaping, thus minimizing the possibility of apical extrusion of materials, creates unhindered passage of instrument into the apical area once the coronal two-thirds are enlarged and allows for better penetration of the irrigant.<sup>18</sup>

Only 20.45% of the general dental practitioners used crown-down technique while 70.45% and 20.45% still followed step-back technique and filling technique respectively.

Calcium hydroxide is considered as the standard intracanal medicament for inter-appointment dressing.<sup>19</sup> It was used by huge majority (96.2%) of the respondents.

In the present study, sodium hypochlorite was the most dominant root canal irrigant amongst general dental practitioners, followed by normal saline, EDTA and hydrogen peroxide. Over the 70 years, sodium hypochlorite has been used because of its effective antimicrobial and tissue solving action.<sup>20</sup>

Most the clinicians was found to use 0.5% of sodium hypochlorite. Reason behind for choosing diluted form of sodium hypochlorite could be due to the limited use of rubber dam. Nevertheless previous study have showed that the most effective irrigation regimen is 5.25% at 40 minutes for effective removal of *E. faecalis* from infected dentin cylinders.<sup>21</sup> It was observed that use of 5.2 concentration of sodium hypochlorite was adopted by fewer number of practitioners

The rationale of the obturation of root canal treatment is to prevent the reinfection of root canals that have been biomechanically shaped and cleaned and disinfected by instrumentation, irrigation and medication procedures. Majority of the general dental practitioners have found to use lateral condensation technique to obturate the root canal space.

Apparently general dentists in kathmandu are not strong promoters of the more recent advanced technique of obturation. This may be attributed to extra cost involved or the lack of skill and training. Result of this study is similar to previous studies.<sup>22,23</sup>

As per the guidelines of the European Society of Endodontists<sup>24</sup>, root canal sealers should be biocompatible. The re-

sults of this study presented the popularity of ZnOE sealer among general dental practitioners of Kathmandu. Endodontists and general dental practitioners enjoy a strong mutual relationship. More than 60% of general dental practitioners refer patients to endodontists. Referral cases were related to root curvature, missed canals, canal calcification, apicoectomy, ledge formation, instrument fracture and open apex.

## CONCLUSION

The current study reviewed the method, material and attitude employed by general dental practitioners to perform root canal treatment. General practitioners did not seem to use recently introduced techniques. Despite the availability of variety of newer instruments and techniques, most general dental practitioners used conventional preparation and obturation techniques. The study shows need of continuing dental education for practitioners to update their knowledge.

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