# Routine Clinical Practice among Nepalese Endodontists: A Survey

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## ABSTRACT

**Introduction:** Updates in endodontics have led to innovations in contemporary practice that bears ittle resemblance to endodontic practice of a decade ago. Hence, there is a need for standardisation of techniques. However, before outlining standard guidelines for acceptable endodontic treatment from all dental practitioners in Nepal, we need to explore clinical practice among endodontists.

**Objective:** The objective was to assess the routine practice among Nepalese endodontists.

**Materials and Method:** A descriptive cross-sectional study was carried out among all registered endodontists (56). Convenience sampling technique was utilised for census data collection. Data were collected in a questionnaire-based proforma, entered in Microsoft Excel and results were presented as frequencies and percentages.

**Result:** Cotton roll (42, 75%) was the commonest isolation method used. Combination of radiograph and apex locator (49, 87.5%) was popular for working-length determination. Rotary (49, 87.5%) root canal system was used by most and Universal protaper (36, 64.3%) in that. Almost all endodontists preferred glide path (52, 92.9%) and all (56, 100%) used sodium hypochlorite for irrigation. Calcium hydroxide was the commonest (55, 98.2%) intracanal medicament used. Most endodontists used AH Plus (40, 71.4%) sealer and mineral trioxide aggregate, MTA (46, 82.1%) as retrograde filling. However, only 27 (48.2%) used PRF in apicoectomy and the commonest complication encountered was mid-treatment pain by 33 (58.9%).

**Conclusion:** Endodontic practice by Nepalese endodontists are similar to international guidelines. However, there is no uniformity among endodontists themselves. Hence, we need to have a consensus among Nepalese endodontists regarding uniform pattern in routine endodontic practice.

**Keywords:** Biomechanical preparation; dentistry, endodontic practice, survey, isolation.

## INTRODUCTION

Consumer satisfaction is playing an increasingly All clinical procedures of endodontic treatment are designed to maintain teeth in a functional state in dental arch.1 Success of endodontic treatment relies on the effectiveness of cleaning and shaping and the quality of disinfection and obturation of the root canal system.[2] Challenges of ensuring the dental arch free of pulp and periapical diseases have contributed to numerous innovations in contemporary endodontic practice, like: changes in concepts, techniques, instruments, and materials.[3] These updates in the field of endodontics have been

so rapid in recent years that the current root canal treatment (RCT) bears little resemblance to that of a decade ago.[4]

Consequently, dentists are facing with numerous materials and techniques and dental schools require modification in curriculum accordingly.[3,5] Various investigations have been carried out to explore the standards of RCT practised by general dental practitioners.[1-4,6] European Society of Endodontology has proposed guidelines which must be followed for standard care.[7]

However, before outlining standard guidelines for acceptable endodontic treatment from all dental practitioners in Nepal, we need to explore clinical practice among endodontists. Thus, the objective was to assess the routine practice among Nepalese endodontists from different sectors which may help to form guidelines to ensure acceptable endodontic treatment outcomes.

## MATERIALS AND METHOD

A descriptive cross-sectional (observational) study was carried out among all 56 Nepal Medical Council registered endodontists working in different sectors of Nepal. Ethical approval was taken before embarking upon the study from institutional ethical committee (KDC-IRC). The data for questionnaire-based survey was collected from endodontists practicing all over Nepal and final compilation was carried out in the department of Conservative Dentistry and Endodontics of Kantipur Dental College, Kathmandu from 2018 November to December. The inclusion criteria included Nepalese endodontists registered with Nepal Medical Council (NMC) practising in Nepal. The exclusion criteria were: non NMC registered endodontist; non-Nepalese endodontist (foreign national), general dental practitioner practicing endodontics, and endodontist unwilling to sign an informed consent. Confidentiality was maintained to utmost. The proforma contained demographic details of respondents and close-ended questions that were derived from previously published studies.[1-4,8] The questions had multiple choice options on root canal instrumentation system, irrigants and its systems, intra canal medicaments, techniques of working-length determination, root filling techniques and sealers, scope of endodontic surgery which he/ she has been following in his/ her routine practice. The participants had to choose only one option except where multiple selections mentioned. Convenience sampling technique was utilised for census data collection. The data were entered in Microsoft Excel and results are presented as frequencies and percentages.

## RESULT

The mean age of the participants was 36.55±4.30 years and the average work experience was 5.75±4.042 years (Table 1). Most endodontists (male 37.5%, female 62.5%) had obtained their masters degrees from Nepal (20, 35.7%) followed by China, India, and Bangladesh (Table 2). Half (28, 50%) of the endodontists practised in both academic as well as clinical sectors, among which (42, 75%) worked in private clinics and hospitals only. About 30 (53.6%) worked in private setting that belonged to others.

Cotton roll (42, 75%) was the commonest isolation method used followed by saliva ejectors and rubber dam. Both radiograph and apex locator were used by most (49, 87.5%) for working-length determination. Rotary (49, 87.5%) was the root canal system commonly used and Universal protaper (36, 64.3%) in that. Almost all endodontists preferred glide path (52, 92.9%) and all 56 (100%) used sodium hypochlorite for irrigation. Calcium hydroxide was the commonest (55, 98.2%) intracanal medicament used and lateral compaction was the preferred technique for obturation of root canals by 39 (69.6%) participants.

Most endodontists used AH Plus (40, 71.4%) sealer and mineral trioxide aggregate, MTA (46, 82.1%) as retrograde filling. However, only 27 (48.2%) used Platelet-rich fibrin (PRF) in apicoectomy and the commonest complication encountered was mid-treatment pain by 33 (58.9%, Table 2).

**Table 1: Age and work experience of the participating endodontists.**

| | Mean ± S.D. | S.E.M | Minimum | Maximum |
|---|---|---|---|---|
| Age | 36.55 ± 4.30 | 0.575 | 29 | 46 |
| Experience in Years | 5.75 ± 4.042 | 0.540 | 1 | 20 |

Table 2: Demographics and responses of the participants.

| Particulars | n (%) |
|---|---|
| **Sex** | |
| Male | 21 (37.5) |
| Female | 35 (62.5) |
| **Graduation Country** | |
| Nepal | 20 (35.7) |
| China | 19 (33.9) |
| India | 11 (19.6) |
| Bangladesh | 6 (10.7) |
| **Practice Sector** | |
| Academic (teaching hospitals) only | 15 (26.8) |
| Clinical (clinics and hospitals) only | 13 (23.2) |
| Both | 28 (50) |
| **Area of Service** | |
| Government only | 5 (8.9) |
| Private only | 42 (75) |
| Government and Private | 9 (16.1) |
| **Clinical Practice** | |
| Self employed | 10 (17.9) |
| Works in other's practice | 30 (53.6) |
| Self and other's practice | 16 (28.6) |
| **1. Which isolation method you often use? (multiple answers)** | |
| Rubber dam | 26 (46.4) |
| Cotton roll | 42 (75) |
| Saliva ejectors | 30 (53.6) |
| Others | 1 (1.8) |
| **2. Which method do you use for working-length determination? (multiple answers)** | |
| Radiographic technique | 5 (8.9) |
| Tactile sense | 6 (10.7) |
| Electronic apex locator | 3 (5.4) |
| Combination of radiographic and apex locator | 49 (87.5) |
| **3. Which types of root canal system do you use? (multiple answers)** | |
| Hand NiTi | 25 (44.6) |
| Rotary | 49 (87.5) |
| Stainless Steel file | 17 (30.4) |
| **4. Which type of rotary system do you use?** | |
| Protaper gold | 24 (42.9) |
| Protaper universal | 36 (64.3) |
| Hyflex | 25 (44.6) |
| Single file system | 6 (10.7) |
| Others | 7 (12.5) |
| **5. Do you prefer glide path?** | |
| Yes | 52 (92.9) |
| No | 4 (7.1) |
| **6. Which types of irrigation solution you use? (multiple answers)** | |
| Normal Saline | 30 (53.6) |
| Sodium Hypochlorite | 56 (100) |
| Hydrogen Peroxide | 3 (5.4) |
| 2% Chlorhexidine | 27 (48.2) |
| Others (EDTA all) | 4 (7.1) |

| | |
|---|---|
| **7. Which types of irrigation system do you use? (multiple answers)** | |
| Syringe with endodontic irrigating needle | 25 (44.6) |
| Syringe with normal needle | 36 (64.3) |
| Electric endodontic irrigating device with endodontic needle | 4 (7.1) |
| Others (Endo activator) | 1 (1.8) |
| **8. When do you start Biomechanical preparation of root canal? (multiple answers)** | |
| 1st visit | 39 (69.6) |
| 2nd visit | 28 (50) |
| 3rd visit | 2 (3.6) |
| **9. Which type of intracanal medicament do you use? (multiple answers)** | |
| Cresophene | 6 (10.7) |
| Eugenol | - |
| Calcium hydroxide | 55 (98.2) |
| Others | 5 (8.9) |
| **10. Which technique do you follow for obturation of root canal? (multiple answers)** | |
| Single Cone System | 33 (58.9) |
| Lateral Compaction technique | 39 (69.6) |
| Vertical Compaction technique | 11 (19.6) |
| Thermoplastic technique | 23 (41.1) |
| Others | - |
| **11. Which sealer do you use? (multiple answers)** | |
| Zinc oxide eugenol | 15 (26.8) |
| Endomethasone | 9 (16.1) |
| AHplus | 40 (71.4) |
| Sealapex | 5 (8.9) |
| MTA Fillapex | 9 (16.1) |
| Others (all answered Guttaflow) | 3 (5.4) |
| **12. What types of RCT-related complication you mostly faced often in your practice? (multiple answers)** | |
| Irrigant related | 1 (1.8) |
| Perforation | 3 (5.4) |
| Mid treatment pain | 33 (58.9) |
| Post-operative pain | 8 (14.3) |
| Swelling | 2 (3.6) |
| Over obturation | 9 (16.1) |
| Under obturation | 13 (23.2) |
| Others | 9 (16.1) |
| **13. How do you manage tooth with lesion >10mm in diameter? (multiple answers)** | |
| Extraction | 2 (3.6) |
| RCT only | 25 (44.6) |
| Refer | - |
| RCT followed by Apicoectomy | 39 (69.6) |
| **14. Do you practice Apicoectomy?** | |
| Yes | 44 (78.6) |

## DISCUSSION

The respondents of this study (all Nepalese endodontists registered with NMC) provided valuable information on the current status of endodontic practice in different sectors of Nepal.

Isolation by rubber dam is one of the very important of steps in endodontic therapy. It prevents the risk of aspiration or inhalation of instruments, reduces flooding of irrigants to oral cavity, improves visibility of operating field and protects dentists from contaminated aerosols.9 So, European Society

of Endodontology recommends that endodontic treatment be carried out when the tooth is isolated with rubber dam.[7] In this study, 46.4% of respondents used rubber dams whereas, 75% of respondents were using cotton rolls as isolation of operating field which is almost similar to practice in Turkey.[2] Although rubber dam is the best method for isolating a tooth for root canal treatment, it has been seen that rubber dam is less likely to be adopted by the endodontists in all cases.

The working-length determination is another very important step in endodontic treatment. Accurate working-length provides better prognosis[10] and it can be determined by several methods.[11] Traditionally, working-length determination has been done by radiographs of root canal instruments as they provide length of root canal as well as size and shape of root canal system with anatomic variations.[12] On the other hand, radiographs represent a two-dimensional image of a three-dimensional object. As a result, there may be superimposition of roots and anatomic structures leading to incorrect estimation of working-length.[13] Electronic apex locators, which do not require radiation exposure, locate the canal terminus by means of electronic measurements. There are many comparative studies which show it to be superior to traditional method.[14-17] Therefore, combination technique with radiographs and electronic apex locator has been advocated for the correct determination of working-length.13,16 This is consistent with the findings of current study which showed that 87.5% of respondents were using combination technique for working-length determination whereas, 8.9% respondents were using radiographic technique only and 5.4% of respondents were using electronic apex locator only.

In endodontic treatment, after determination of working-length, biomechanical preparation of root canal system plays a critical role for better prognosis of endodontic treatment. The main objective of biomechanical preparation is to clean, shape and eliminate microorganisms within the root canal.[1] It can be done at the first visit or at other visits of inter-appointment of treatment depending upon clinician's choice. In this study, 69.6% of the respondents were doing biomechanical preparation at the first visit itself. Almost 87.5% of respondents were using rotary NiTi of which 64.3% of respondents were using Protaper Universal and 44.6% were using Hyflex. Parashos et al study of more than a decade ago had showed 64% of the Australian endodontists had integrated rotary NiTi in their endodontic practice.[18] This comparison shows positive change in endodontic practice. Others were not familiar with rotary NiTi and thought it was too expensive.

In between instrumentation of root canal, irrigation plays a very important role in cleaning and disinfection of root canal system. Most studies like Udoye et al1 and Chan et al[3] show that, sodium hypochlorite and normal saline are the most popular irrigants for endodontic practices. In this current study, all the respondents were using sodium hypochlorite as it has better antimicrobial properties and in some cases, they preferred normal saline and 2% chlorohexidine for sustainability properties. Almost 64.3% of respondents were using irrigation solution by syringe with normal needle whereas 7.1% of respondents were using electric endodontic irrigating device with endodontic needle in their practice.

It is impossible to create a sterile root canal system through mechanical means alone, the use of intracanal medicaments becomes important, especially in multiple appointment RCTs.[19] The purpose of intracanal medicaments is to reduce bacterial load, control pain, reduce inflammation, dry wet canal.[20] In current study, 98.2% of respondents were using calcium hydroxide as intracanal medicament due to its effective antimicrobial properties.

Clinical success of any endodontic treatment is dependent on proper access, cleaning and shaping, disinfection, and sealing of root canals. Almost 60% of endodontic treatment failures occur due to incomplete and improper obturation of root canal system. Therefore, three-dimensional sealing ability of obturating material leads to decreased risk of apical microleakage and as a result increased success rate of endodontic treatment.[21] So, selection of better sealer and obturation technique plays a great role in success of endodontic treatment. In this study, 58.9% of respondents follow the single cone system and 71.4% of respondents were using AH Plus and 16.1% were using MTA Fillapex as sealer to obdurate the root canal system.

During endodontic practice, a clinician might face various RCT related complications even after following standard practical protocol. In current study almost 58.9% of respondents were facing mid-treatment pain which could be due to activation of infection after instrumentation or may be due to sensitivity to intra canal medicaments.

In this study, 78.6% of respondents were practicing apicoectomy and 69.6% of respondents were

managing tooth with lesion >10 mm in diameter by RCT followed by apicoectomy whereas, 82.1% preferred MTA as retrograde filling material as, it has better sealing ability, biocompatibility as well as it can set even in wet environment. According to this study, only 48.2% of respondents were using PRF in apicoectomy though PRF helps in stimulation of osteoblast cells which results in acceleration of bone healing of surgical site.

The limitation of this study was its inability to deal with each and every respondent personally about specific contexts as it was a self-administered questionnaire-based study.

## CONCLUSION

Endodontic practice by Nepalese endodontists is almost similar to some international guidelines like that of European Society of Endodontology. However, it differs in some such as use of rubber dam isolation, rotary systems, irrigation system. Also the practices are not uniform by all Nepalese endodontists. Hence, it is recommended that, before sketching the standard guidelines to ensure acceptable endodontic treatment from all dental practitioners, first we need to have a consensus among Nepalese endodontists regarding uniform pattern in routine endodontic practice.

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