

# KNOWLEDGE, ATTITUDE AND PRACTICE OF DENTAL PRACTITIONERS TOWARDS MANAGEMENT OF ENDODONTICALLY TREATED TEETH

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## ABSTRACT

The restoration of endodontically treated teeth (ETT) is a vital aspect of dental care, influencing long-term tooth survival and overall oral health. This descriptive, cross-sectional survey assessed the knowledge, attitudes, and practices of 201 dental practitioners in Kathmandu Valley regarding post-endodontic restoration. Results showed that most participants demonstrated strong theoretical knowledge, with 63.2% favoring post and core restorations and 87.5% recognizing the importance of a ferrule. While positive attitudes were shown by a large percentage 87.4% which agreed on the significance of restoring ETT, while practical implementation was inconsistent. Notably, only 19.8% consistently used a rubber dam despite 90.5% acknowledging its necessity. Most participants, 97.5% adapted techniques based on clinical conditions, and 96.5% engaged in continuing education. The study highlights a knowledge-practice gap, especially in infection control and post utilization of technique. These findings underscore the need for targeted clinical training and standardized protocols to ensure evidence-based, consistent restoration practices for improved patient outcomes.

## KEYWORDS

Dental practitioner, endodontic treatment, restoration

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## INTRODUCTION

Endodontic treatment is the most commonly performed dental procedure, the aim of this treatment is to preserve the natural tooth structure and to maintain the stability of dental arch.<sup>1</sup> The completion of endodontic treatment only doesn't mean the end of patient management.<sup>2</sup> The restoration of endodontically treated teeth back to its form, function, and aesthetics is the most challenging part of modern dentistry because endodontic treatment is largely performed on teeth with significant tooth loss due to dental caries, injury, breakage, which, further weakens the tooth.<sup>3,4</sup> The longevity of the teeth is suggested by the amount of remaining sound tooth structure and the ability of the restorative materials to replace the missing tooth structure, which also reduces the risk of failure of root canal treatment due to bacterial microleakage.<sup>5,6</sup> There has always been a debate regarding the ideal technique for restoration of endodontically treated teeth due to loss of coronal tooth structure which affect the biomechanical behavior of affected teeth.<sup>7</sup>

For the final restoration of endodontically treated teeth, various treatment options have been proposed like, post-core, partial or full coverage crowns and direct resin composite or amalgam filling.<sup>5,8,9</sup> Structurally compromised endodontic treated teeth often require post but selection of post can be the difficult part where there are various options like metal post, fiber post, there are studies in which fiber reinforced resin post are better option for root canal treated teeth due to its elastic modulus similar to dentin, which results in a more even distribution of load through the long axis of tooth.<sup>10-12</sup>

Several studies have shown that the amount and the quality of the remaining coronal dentin structure can affect the biomechanical behavior of the endodontically treated teeth restored with posts. The height of the remaining coronal dentine is well known as a ferrule and offers support to the remaining coronal tooth structure against occlusal loading and lateral forces.<sup>10-12</sup> If the post is made with 1-2mm of ferrule in an endodontically treated teeth, it will have an increased resistance to fracture.<sup>13</sup>

In a study done in 2016 by Kavlekar *et al*,<sup>14</sup> showed that 89.3% prosthodontists, 81.2% endodontists, and 90.5% general practitioners believed that post is not necessary for endodontically treated teeth. Some studies suggest that the ferrule with 1mm height shows increase resistance to fracture versus teeth without ferrule.<sup>3,6,15</sup>

There are some studies which indicate that posts should only be used in case of extensive coronal structure loss, and post also may decrease fracture resistance when ferrule is not given.<sup>16,17</sup>

In study done in 2020 by Sharma *et al*,<sup>18</sup> results showed that post endodontic management of endodontically treated teeth was better among specialists. It is difficult to give an absolute technique for the restoration of endodontically treated teeth. The studies done also gives vague evidence. And there is no such similar study found in this region.

This survey would be useful to understand the current state of clinical awareness and practice among the practitioner, which can provide insights into the areas requiring enhanced training or educational intervention. By addressing these aspects, the research aims to improve patients' outcomes, optimize treatment protocols, and contribute to the advancement of evidence-based dental practices.

## MATERIALS AND METHODS

This study is a questionnaire based descriptive, cross-sectional study. The questionnaire was distributed among dental practitioners of Kathmandu Valley with the help of social media (google form). This study was conducted between November 2024 - January 2025.

The questionnaire included socio-demographic details and questions related to knowledge, attitude, and practice regarding the management of endodontically treated teeth adopted from a study done by Sharma *et al*.<sup>2</sup> The first part of the questionnaire elicits information on the demographic attributes of the participants, specialty, year of experience in the field, number of cases in a month. The second part was designed to assess the participant's knowledge towards the management of endodontically treated teeth, third part to assess the participant's attitude towards the management of endodontically treated teeth and the last part of the questionnaire was to assess the practice of participants towards the management of endodontically treated teeth. There are eight questions regarding knowledge with multiple responses, five regarding attitude with responses on Likert scale and five questions regarding practice with dichotomous options (Yes/No).

All the relevant data were entered and coded into Microsoft Excel and then exported for analysis with the help of SPSS-17. The statistical analysis consisted of frequencies, percentage,

mean and standard deviation. The study was approved by Institutional Review Committee of Nepal Medical College (Ref. No.: 26-081/82).

## RESULTS

A total of 201 study participants responded to the questionnaire with a response rate of 98.0%. The highest number of participants in this study were young dental professionals, with the largest group 80 (39.8%) were aged between 25–30 years. Most of the respondents were female, 151 (75.1%), while 50 (24.9%) were male. In terms of qualifications, 51.7% completed BDS degree, and 48.3% were awarded with a master's degree (MDS). Among those with an MDS, the majority specialized in endodontics (39.2%).

Table 2 shows the responses of participants to questions assessing their knowledge. Most of the dental professional (63.2%) preferred the use of post and core for restoring grossly decayed endodontically treated teeth, while only 1% prefer inlay or onlay. A significant

portion of respondents (88.5%) agreed that using a rubber dam is essential during the restoration of endodontically treated teeth.

Most participants (66.4%) believe failure of endodontically treated teeth is due to endodontic failure. Post reinforces endodontically treated teeth and reduces fracture probability (76.1%). Dual-polymerized adhesive resin cement is the most preferred for the post cementation (68.0%). When it came to post cementation, dual-polymerized adhesive resin cement was the most preferred material, chosen by 68.0% of respondents

Table 3 presents the responses of participants to questions related to their attitudes toward the management of endodontically treated teeth. Most respondents (87.4%) strongly agreed that restoring endodontically treated teeth is highly important, with only a small proportion (1.0%) expressing disagreement. Regarding the impact of restoration on the longevity of endodontically treated teeth, 76.8% strongly agreed that proper restoration contributes significantly to long-term tooth survival. Furthermore, 90.8% of participants strongly agreed on the necessity of using a rubber dam during restoration procedures, although 9.2% strongly disagreed with this practice.

Result from Table 4 in practice related question 85.4% of the participants use different materials and methods to treat endodontically treated teeth depending on the conditions of the teeth.

## DISCUSSION

The management of endodontically treated teeth (ETT) is a critical aspect of restorative dentistry, directly influencing long-term tooth survival. This study explored the knowledge, attitude, and practice patterns among dental professionals, with attention to how demographic and professional backgrounds shape their approach to post-endodontic restorations.

The study was predominantly composed of young professionals aged 25–30 years (39.8%) with less than five years of clinical experience (46.3%). This demographic trend suggests a workforce largely in the early stages of their careers, potentially more receptive to new materials and techniques but possibly lacking in practical experience. Female practitioners formed the majority (75.1%), consistent with the global trend of increasing female representation in dentistry.<sup>19</sup>

A nearly equal representation of BDS (51.7%) and MDS (48.3%) degree holders enabled

**Table 1: Sociodemographic characteristics of the study participants**

Variables		n (%)
Age (in years)	25-30	80 (39.8)
	31-35	51 (25.4)
	36-40	41 (20.4)
	More than 40	29 (14.4)
Gender	Male	50 (24.9)
	Female	151 (75.1)
Degree	BDS	104 (51.7)
	MDS	97 (48.3)
Specialty	Endodontics	38 (39.2)
	Oral medicine	3 (3.1)
	Oral pathology	5 (5.1)
	Oral and maxillofacial surgery	4 (4.1)
	Orthodontist	12 (12.4)
	Pedodontist	12 (12.4)
	Periodontist	7 (7.2)
	Prosthodontist	16 (16.5)
Years of practice	1-5	93 (46.3)
	6-10	51 (25.3)
	11-15	35 (17.4)
	16-20	11 (5.5)
	More than 20	11 (5.5)

**Table 2: Distribution of study participants according to responses on knowledge related questions**

SN	Questions	Responses	BDS n (%)	MDS n (%)	Total n (%)
1	Mode of restoring the grossly decayed endodontically treated teeth (n=201)	Composite	5 (4.8)	5 (5.2)	10 (5.0)
		Inlay or Onlay	-	2 (2.1)	2 (1.0)
		Full coverage crown	31 (29.8)	31 (31.9)	62 (30.8)
		Post and Core	68 (65.4)	59 (60.8)	127 (63.2)
2	Is rubber dam necessary for restoring the endodontically treated teeth? (n=200)	Yes	91 (88.3)	86 (88.7)	177 (88.5)
		No	12 (11.7)	11 (11.3)	23 (11.5)
3	Most frequent reason for failure of endodontically treated teeth (n=199)	Endodontic failure	75 (73.5)	57 (58.8)	132 (66.4)
		Crown failure	14 (13.7)	27 (27.8)	41 (20.6)
		Root failure	6 (5.9)	5 (5.2)	11 (5.5)
		Other	7 (6.9)	8 (8.2)	15 (7.5)
4	Is creating a ferrule below the core foundation following post cementation increases fracture resistance? (n=192)	Yes	83 (86.5)	85 (88.5)	168 (87.5)
		No	13 (13.5)	11 (11.5)	24 (12.5)
5	What type of cement do you use for post cementation? (n=194)	Dual-polymerized adhesive resin cement	59 (60.8)	73 (75.3)	132 (68.0)
		Chemically polymerized adhesive resin cement	6 (6.2)	7 (7.2)	13 (6.7)
		Self-adhesive resin cement	27 (27.8)	11 (11.3)	38 (19.6)
		Others	5 (5.2)	6 (6.2)	11 (5.7)
6	Post reinforces endodontically treated teeth and reduces fracture probability (n=196)	Yes	86 (86.0)	63 (65.6)	149 (76.1)
		No	14 (14.0)	33 (34.4)	47 (23.9)
7	Placement of a post is affected by factors (n=197)	Quantity of the tooth structure	87 (87.0)	79 (81.4)	166 (84.3)
		Location of the tooth in arch	3 (3.0)	7 (7.2)	10 (5.1)
		Type of planned restoration	7 (7.0)	9 (9.3)	16 (8.1)
		Other	3 (3.0)	2 (2.1)	5 (2.5)
8	The type of prefabricated post that has more retentive (n=191)	Parallel-sided post	31 (32.6)	34 (35.4)	65 (34.0)
		Tapered post	16 (16.8)	9 (9.4)	25 (13.1)
		Parallel tapered post	21 (22.1)	23 (23.9)	44 (23.1)
		Combined parallel-sided/Tapered design	27 (28.5)	30 (31.3)	57 (29.8)

an insightful comparison between general practitioners and specialists. Notably, endodontists constituted the largest specialty group (39.2%), which is significant considering their direct involvement in both root canal treatment and restorative decision-making. This diversity in specialization reflects varying levels of expertise and influences the uniformity of clinical protocols used for managing ETT.

In knowledge related questionnaire overall, participants showed a moderate to high level of knowledge regarding the restoration of ETT. A majority (63.2%) correctly identified post and core as the preferred method for restoring grossly decayed ETT.<sup>20</sup> However, the low preference for inlays or onlays (1.0%) suggests a possible knowledge gap or under utilization

**Table 3: Distribution of study participants according to responses on attitude related questions**

SN	Questions	Responses	BDS n (%)	MDS n (%)	Total n (%)
1	Restoration of endodontically treated teeth is very important (n=199)	Strongly agree	87 (85.2)	87 (89.7)	174 (87.4)
		Agree	15 (14.8)	9 (9.3)	24 (12.1)
		Disagree	-	1 (1.0)	1 (0.5)
		Strongly disagree	-	-	-
2	Restoration of endodontically treated teeth increases the longevity of teeth (n=198)	Strongly agree	71 (69.6)	81 (84.4)	152 (76.8)
		Agree	31 (30.4)	14 (14.6)	45 (22.7)
		Disagree	-	1 (1.0)	1 (0.5)
		Strongly disagree	-	-	-
3	Use of rubber dam is necessary is very important during restoring endodontically treated teeth (n=196)	Strongly agree	89 (89.0)	89 (92.7)	178 (90.8)
		Agree	-	-	-
		Disagree	-	-	-
		Strongly disagree	11 (11.0)	7 (7.3)	18 (9.2)
4	Post and core are the most favorable method to restore teeth with 50% destroyed crown structure (n=198)	Strongly agree	40 (39.2)	36 (37.5)	76 (38.4)
		Agree	55 (53.9)	48 (50.0)	103 (52.0)
		Disagree	6 (6.0)	11 (11.5)	17 (8.6)
		Strongly disagree	1 (0.9)	1 (1.0)	2 (1.0)
5	Root canal treatment failure is the most important reason for endodontically treated teeth failure (n=199)	Strongly agree	23 (22.5)	24 (24.7)	47 (23.6)
		Agree	67 (65.7)	53 (54.6)	120 (60.3)
		Disagree	11 (10.9)	20 (20.6)	31 (15.6)
		Strongly disagree	1 (0.9)	-	1 (0.5)

**Table 4: Distribution of study participants according to responses on practice related questions**

SN	Questions	Responses	BDS n (%)	MDS n (%)	Total n (%)
1	I restore every endodontically treated teeth (n=199)	Yes	89 (87.3)	81 (83.5)	170 (85.4)
		No	13 (12.7)	16 (16.5)	29 (14.6)
2	I use different materials and methods to treat endodontically treated teeth depending on the conditions of the teeth (n=199)	Yes	100 (98.0)	94 (96.9)	194 (97.5)
		No	2 (2.0)	3 (3.1)	5 (2.5)
3	I increase my knowledge time with the help of articles, participating in CDE programs, Internet (n=199)	Yes	98 (96.1)	94 (96.9)	192 (96.5)
		No	4 (3.9)	3 (3.1)	7 (3.5)
4	I always use rubber dam during restoration of ETT (n=197)	Yes	16 (16.0)	23 (23.7)	39 (19.8)
		No	84 (84.0)	74 (76.3)	158 (80.2)
5	I always use post core in grossly decayed endodontically treated teeth (n=197)	Yes	71 (70.3)	68 (70.8)	139 (70.6)
		No	30 (29.7)	28 (29.2)	58 (29.4)

of conservative indirect restorative technique where clinically appropriate.

The use of rubber dam, a critical component for moisture control and infection prevention, was endorsed by 88.5% of respondents, demonstrating strong theoretical awareness, which had similar results 86.7% with existing literature highlighting rubber dam usage as standard practice in endodontics and post-endodontic restorations.<sup>21</sup>

Regarding reasons for failure, most respondents (66.4%) attributed failures to endodontic causes, while a smaller proportion identified crown or root failure. This perception indicates a need for more comprehensive understanding of the biomechanical aspects contributing to ETT failure, particularly coronal leakage and inadequate restorations.

In this article, 87.5% recognized the importance of a ferrule design in enhancing fracture resistance, which is a well-documented principle in restorative dentistry.<sup>22</sup> Most of the participants 68.0% preferred dual-cured adhesive resin cement for post cementation reflecting an updated and evidence-based choice known for better polymerization and retention.<sup>23</sup>

However, 23.9% of respondents did not believe that post placement inherently reinforces teeth and reduces fracture, there are studies which favor this study.<sup>24</sup>

Regarding the attitude related questions, participants generally expressed positive attitudes toward the restoration of ETT. A high proportion (87.4%) strongly agreed that post endodontically restoration is essential, and 76.8% believed that proper restoration significantly enhances longevity. This demonstrates a commendable understanding of the importance of timely and appropriate post-endodontic restoration in preventing reinfection and structural failure which is supported by various studies.<sup>25,26</sup>

There was also a strong agreement (90.8%) on the necessity of rubber dam use, which aligns with best practices. However, a small but notable proportion (9.2%) strongly disagreed, suggesting an area for attitude change through further training or reinforcement of infection control protocols but supported by various studies.<sup>27</sup>

In practice related question despite high knowledge and positive attitudes, actual

practices were inconsistent, highlighting a knowledge-practice gap. Although 85.4% of practitioners reported restoring every ETT, only 19.8% consistently used a rubber dam during the procedure, reflecting a significant discrepancy between knowledge and implementation. Similar practice gaps have been reported in other studies, emphasizing the challenges of translating knowledge into clinical behavior.<sup>27,28</sup>

Most practitioners (97.5%) adapted their materials and techniques based on the tooth's condition, showing clinical flexibility. Encouragingly, 96.5% reported continuing education through articles and CDE programs, indicating a commitment to professional development.

However, only 70.6% routinely used post and core in grossly decayed ETT, even though the majority acknowledged its necessity, indicating either underutilization or reliance on alternative methods that may not always be biomechanically favorable.

The results from this study point to a promising level of foundational knowledge and positive attitudes among dental practitioners. However, gaps in consistent clinical application especially regarding rubber dam usage and misconceptions about post reinforcement highlight areas for improvement. Continued education, particularly hands-on workshops and practice-based learning, should be emphasized to bridge the gap between knowledge and clinical implementation.

Additionally, regulatory bodies and institutions should ensure standardized protocols for ETT restoration are emphasized during both undergraduate training and postgraduate practice. Interdisciplinary collaboration, especially between endodontists and prosthodontists, should be promoted to optimize treatment planning and outcomes.

In conclusion, this study reveals that while dental practitioners generally possess good knowledge and positive attitudes toward the restoration of endodontically treated teeth, significant discrepancies exist in practice. Addressing these gaps through focused training and reinforcing evidence-based protocols can enhance the quality of care, minimize failures, and ultimately improve patient outcomes.

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