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Original Article

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Understanding and application of restoring endodontically treated teeth among dentists of Islamabad and Rawalpindi - a twin city survey

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ABSTRACT

BACKGROUND & OBJECTIVE: Endodontically treated teeth undergo loss of tooth structure, resulting in increased fracture susceptibility as compared to unrestored vital teeth. The final restoration following the root canal treatment is of paramount importance. This study aimed to determine current concepts, opinions, and techniques used to restore Endodontically Treated Teeth among dentists of Islamabad and Rawalpindi and compare their knowledge with their clinical practice to determine the gap between their understanding and application.

METHODOLOGY: A cross-sectional study was conducted at Rawal Institute of Health Sciences, Islamabad, from February to June 2022 after ethical approval. A convenience sampling technique was used. About 235 dentists, including house officers, general dentists, postgraduate trainees, and consultants of Endodontics of Islamabad/Rawalpindi, participated. Data was collected by a structured questionnaire widely accepted with Cronbach's alpha of 0.75 through electronic media. Its first part included demographics, while the second part included questions regarding understanding and practice of endodontically treated teeth restoration. Statistical analysis was done by using SPSS 2, the chi-square test, and Fisher's exact test were applied.

RESULTS: The mean age of study participants was 29.0±4.54 years. Out of 235 participants, 76(32.3%) were males and 159(67.75%) were females. The responses regarding technical management of endodontically treated teeth showed significant differences with p-value≤0.001 in the understanding and applications of general dental practitioners and endodontists.

CONCLUSION: A significant difference was found among dentists regarding their understanding and practice of restoring endodontically treated teeth.

KEYWORDS: Dentists, Endodontically, Practice, Restoration.

INTRODUCTION

Endodontics is a dental specialty that deals with pathologies related to dental pulp and tissues surrounding tooth roots [1]. Procedures like root canal treatment, traumatic dental injuries (TDI) treatment, and dental implants lie in this domain [2]. Endodontically treated teeth undergo loss of tooth structure and changes in physical characteristics, such as reduced elastic modulus, fracture resistance, and tooth stiffness, which often leads to increased fracture susceptibility when compared to unrestored vital teeth [3,4]. Literature reports that endodontic treatment alone reduces tooth stiffness by 5% and access cavity preparation and loss of marginal ridges by 20% to 63% and 14% to 44%, respectively [5]. Restorative techniques

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aim at the utmost conservation of natural tooth structure [6]. It is generally agreed that endodontic treatment failure is mostly due to restoration failure rather than endodontic treatment itself [7]. So, the final restoration following the root canal treatment is of paramount importance for a successful outcome otherwise, improper restoration may even lead to tooth failure [8].

The success of endodontically treated teeth mainly relies upon planning the restoration before initiating the root canal treatment. Core build-up may be considered the last step of endodontic treatment [9]. The core build-up options after endodontic treatment vary from simple filling to post-core followed by indirect restoration [10]. A post is placed in the root canal of a tooth when additional retention is needed to retain the core and should provide this support to the core without increasing the risk of root fracture [11]. There are a variety of techniques and procedures used among various dentists for prosthetic restoration of endodontically treated teeth [12].

The extent to which dentists know about the prosthetic restoration of endodontically treated teeth depends much more on their practical experience as compared to their theoretical knowledge [13]. Due to the difference in knowledge and preclinical training, various treatment approaches have been used by dentists in restoring endodontically treated teeth [14]. So, this study was planned to determine current concepts, opinions, and techniques used to restore endodontically treated teeth among dentists of Islamabad and Rawalpindi and compare their knowledge with clinical practice to investigate the gap between the understanding and application.

METHODOLOGY

This is a cross-sectional study carried out in Rawal Institute of Health Sciences, Islamabad, for a period of five months, from February to June 2022. A convenience sampling technique was used for the recruitment of study samples. About 235 dental health professionals participated. House officers, general dental practitioners, postgraduate trainees of endodontics, and endodontic consultants of Islamabad and Rawalpindi, holding licenses to practice and willing to participate, were included in the study. Consent was taken from the participants before data collection. Dental consultants other than endodontists (prosthodontists, orthodontists, maxillofacial surgeons, and periodontists were excluded from the study. The sample size was calculated as 235 by using an open-epi calculator at 5% level of significance and anticipated prevalence at 50% [15].

The study proceeded after the approval from ethical review committee board of Rawal Institute of Health Sciences (Reference# Rawal/RDC/ERC/22/01 dated: January 24, 2022). Informed consent was taken from each participant enrolled in the study. Data was collected by structured questionnaire through electronic media, and the generated link by Google form was circulated to Pakistani dental practitioners via Emails, WhatsApp groups, LinkedIn, Facebook, Twitter, and Instagram. as well as by hand. The questionnaire used was widely accepted with a Cronbach alpha of 0.75 [16]. It is comprised of two parts. The first part included demographics, while the second part included questions regarding understanding and applications in endodontically treated teeth.

Statistical analysis was done by using the statistical package for Social Sciences Version 21.0 with a 95% confidence interval. The chi-square test and Fischer's exact test were used to compare the knowledge and practice in restoring endodontically treated teeth.

RESULTS

The mean age of the study participants was 29.0± 4.54 years when the data was considered to be normally distributed. Out of 235 participants, 76(32.3%) were males and 159(67.75%) were females. On the basis of speciality, 67(28.5%) house officers, 74(31.5%) post graduate trainees, 45(19.1%) endodontists, and 49(20.9%) general dentists participated in the study. One hundred and thirty-three (56.6%) had less than 5 years of experience, 79 participants had 5-10 years of experience, and 23 participants had >10 years of experience. Eighty-two dentists (34.9%) reported working in government institutes, 103(43.8%) dentists work in academic institutes, and 50(21.2%) dentists work in private clinics.

Table-I depicts the frequency of procedures (crowning, need for cuspal coverage, and post-placement) with the distribution of dentists on the basis of seniority. Overall, the provision of cuspal coverage on posterior teeth was found to be more frequent. However, post-placement was found to be the least frequent.

While assessing the understanding and applications, "Speciality" was categorized into two groups. The first group was without an in-depth understanding of the subject specialty (house officers and general dentists), and the second group included those with a thorough understanding of endodontics (postgraduate trainees and consultants). (Table II) The responses regarding the technical management of endodontically treated teeth showed significant differences ($p \leq 0.001$) in the understanding and applications of general dentists and endodontists. It was found that endodontists had more knowledge and understanding 88(73.9%), and they believed in its application 94(79%) that the clinician who performed the root canal procedure should be the one placing the posts. No significant difference was found regarding understanding (p-value=0.203) and application (p-value=0.152) of the placement of rubber dam among the two groups of practitioners.

In the technical management of endodontically treated teeth, non-significant results were found for time from obturation to start post-space placement ($p > 0.05$) among the general dentists and endodontists.

Table-III: Association between general dentists and endodontists regarding time-related understanding and application during endodontically treated teeth restoration and post-placement.

Technical management of Endodontically Treated Teeth	Understanding n(%)		χ2 value	p-value	Application n(%)		χ2 values	p-value
	General Dentists	Endodontists			General Dentists	Endodontists		
Time from obturation to start Post Space Preparation?								
Immediately after obturation	25 (21.6)	35(29.4)	5.05	0.170	29(25.0)	22(18.5)	2.75	0.431
1–7 days after obturation	45(38.8)	51(42.9)			63(54.3)	77(64.7)		
2-4 weeks after obturation	40(34.5)	26(21.8)			21(18.1)	18(15.1)		
More than a month after obturation or duration of time is irrelevant	6(5.2)	7(5.9)			3(2.6)	2(1.7)		
Time of Post Space Preparation in presence of peri-apical lesion?								
Immediately after Root Canal Treatment	10(8.6)	5(4.2)	5.61	0.134	6 (5.2)	8(6.7)	2.03	0.559
One week after Root Canal Treatment	34(29.3)	41(34.5)			36 (31.0)	40(33.6)		
6 months after Root Canal Treatment	16(13.8)	8(6.7)			15 (12.9)	9 (7.6)		
Until there is evidence of peri-apical healing	56(48.3)	65(54.6)			59 (50.9)	62(52.1)		

DISCUSSION

The present study assessed the differences among dentists about their knowledge, understanding, and practical implementation in clinical settings. Overall, no significant difference was seen in the selection of procedure among participants. On the contrary, previous literature has shown differences in the selection of procedures among dentists with different levels of specialties as well as on a seniority basis [17,18]. The present study showed a significant difference in the expertise of "post preparation". Endodontics are subject specialist, and their clinical hand reflects it. Similar findings have been reported in various types of research that the choices for the selection of restorative preferences varied depending on the level of speciality and time [19, 20]. Most of the participants from both the groups had basic education regarding rubber dam placement and were well aware that it should be placed in endodontic treatments. Albeit of the prior knowledge, both the groups were not practicing it in their settings [21]. Previous literature showed that rubber dam usage for endodontic treatments is highly recommended since it provides better isolation and prevents the swallowing of instruments [22]. It was also suggested previously that students should be provided complete training by the final year of their academic years so that they can practice during internship and onwards [23].

In the current study, it was found that cuspal coverage on posterior teeth was practiced more among all the participants. This finding is in concordance with the study conducted in Saudi Arabia. In this study, dentists from all groups stated that post-placement procedures are not frequently done in general practice [24]. However, this finding contradicted the results of another study, which stated that 62% of dentists chose post-placement depending on the remaining tooth structure, and the treatment plan was designed accordingly [25]. The majority of dental health professionals in our study believed that post-space separation should be placed until there is evidence of peri-apical healing. This finding contradicts previous studies, which surprisingly declare that after root canal treatment, delay in post placement will lead to an increase in endodontically treated teeth (ETT) failures and fractures [25]. Literature has also reported that peri-apical lesions might take healing months to years to heal completely [26]. However recent clinical studies also showed that placement of posts with or without apical lesions had no effect on the outcome of endodontically treated teeth [27]. Therefore, it is recommended that the post-placement should not be delayed.

CONCLUSION

The significant difference was found among dentists both in understanding as well as practices in the restoration of endodontically treated teeth. Endodontically treated teeth require proper apical seals as well as coronal seals. However, cuspal coverage after root canal treatment is necessary to avoid Endodontically treated teeth failures and fractures, along with proper isolation of teeth by a rubber dam.

RECOMMENDATION: It is further recommended for the researchers to work on other parameters of Endodontically Treated Teeth affecting the healing process.

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Author's Contribution:

Rabia Qamar: Substantial contributions to the conception and design of the work.
Seemi Tanvir: Acquisition, analysis, and interpretation of data for the work.
Quratulain Khan: Drafting the work and reviewing it critically for important intellectual content.
Nouman Noor: Acquisition of data for the work.
Sadaf Humayoun: Final approval of the version to be published.
Ayesha Fazal: Interpretation of data for the work.

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