SHORT COMMUNICATION

Survey regarding the use of endodontic posts among dentists of twin cities, Rawalpindi and Islamabad, Pakistan

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Abstract

The purpose of the study was to assess the knowledge, attitude, and practices of dentists of twin cities regarding the use of endodontic posts in root canal treated tooth. A questionnaire was created and distributed among dentists of Rawalpindi and Islamabad via social media platforms regarding the use of posts. The results revealed that majority (60%) of the participants used endodontic posts for teeth with adequate ferrule, and believed that the function of endodontic posts is to retain the core material (50.5%). Glass fibre posts were preferred for anterior teeth (87%), whereas metal posts were favoured in posterior teeth (63%). It was concluded that the main function of the endodontic post is to retain the core material. The commonest indication is when there is at least 2mm of ferrule present and the optimal post length is 2/3rd of the root canal.

Keywords: Post-Core Technic, Endodontically-treated tooth, Dental dowel.

DOI: 10.47391/JPMA.8204

Submission completion date: 05-11-2022
Acceptance date: 09-08-2023

Introduction

Dentists are routinely required to decide whether to extract or retain an extensively damaged tooth by performing root canal therapy.[1] The main goal of root canal therapy is to remove the infected pulp and restore the tooth's integrity and its function.[2] A root canal treated tooth usually has less coronal tooth structure due to caries, trauma, or aggressive removal of tooth structure during endodontic treatment.[3] Prognosis of such an extensively damaged tooth has always been a problematic question for the dentist. Patient's desire to save such a tooth with root canal therapy and complete cuspal coverage restoration is a usual phenomenon. However, this requires the provision of extra support to the coronal structure to withstand the stresses that occur during mastication.[4-5] One such method to support the coronal structure is the placement of endodontic post that provides adequate retention and resistance form to the coronal restoration.[6]

Endodontic posts are usually placed in one or more root canals to strengthen the core material. Various classifications have been proposed for the endodontic posts on the basis of their shape (parallel or tapered posts), material (metal posts or glass fibre posts), or mode of retention in the canals (active posts or passive posts).[7] Not all root canal treated teeth require posts; however, the decision largely depends on the amount of the remaining tooth structure.[8] The restoration of endodontically treated teeth by the use of endodontic posts has long been and still is controversial. Some studies indicate that posts are useful in strengthening weakened tooth structure, whereas other studies indicated that posts added no additional benefit to the remaining coronal tooth structure.[9] Although scientific literature provides sound decision-making tools for the restoration of endodontically treated teeth, dentists have different opinions on the rationale for the use of endodontic posts and selection of post systems.[10] There is no consensus among dental practitioners regarding the use of endodontic posts, type of posts, and their effectiveness in supporting the coronal tooth structure. There are differences in what is recommended for the placement of endodontic posts and what is currently being followed among the dentists of Rawalpindi and Islamabad. The objective of the present study is to assess the knowledge and attitudes of dentists towards restoration of endodontically treated teeth using endodontic posts; the study intends to highlight practicing differences present among these dentists regarding the use of endodontic posts with varying clinical experiences working in different setups of the twin cities.

Patients/Methods and Results

This study was approved by the Armed Forces Institute of Dentistry (AFID) Ethical Committee Review Board vide letter no. 905/432022 dated 4th March 2022. All practicing dentists of Rawalpindi and Islamabad with clinical experience of at least one year were included in

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Table-1: Responses of participants to the questions and their relationship with years of experience

Vignette	Responses n (%)	Experience n (%)				P value
		1-5 years	6-10 years	11-15 years	>15 years	
Function of post	Reinforce tooth structure 87 (43.5%)	46 (52.8%)	33 (37.9%)	8 (9.1%)	0	< 0.001
	Reduce fracture 4 (2%)	0	4 (100%)	0	0	
	Retain core 101 (50.5%)	32 (31.6%)	45 (44.5%)	4 (3.9%)	20 (19.8%)	
	Stress distribution 8 (4%)	0	8(100%)	0	0	
Remaining walls ideal for post placement	3 walls 0	0	0	0	0	<0.001
	2 walls 36 (18%)	20 (55.5%)	4(11.1%)	12(33.3%)	0	
	One wall 44 (22%)	8 (18.1%)	20(45.4%)	0	16(36.3%)	
	No wall 120 (60%)	50 (41.6%)	66 (55%)	0	4(3.3%)	
Length of post	1/3rd of root 41 (20.5%)	17(41.4)	20(48.7%)	0	4(9.7%)	<0.001
	2/3rd of root 125 (62.5%)	61(48.8%)	40(32%)	12(9.6%)	12(9.6%)	
	½ of root 25 (12.5%)	0	21(84%)	0	4(16%)	
	Doesn't matter 9 (4.5%)	0	9(100%)	0	0	
Type of post for anterior tooth	Metal 8 (4%)	0	8(100%)	0	0	<0.001
	Active metal 13(6.5%)	0	9(69.2%)	0	4(30.7%)	
	Zirconia 4 (2%)	4(100%)	0	0	0	
	Glass fibre 175 (87.5%)	74(42.2%)	73(41.7%)	12(6.8%)	16(9.1%)	
Type of post for posterior tooth	Metal 126 (63%)	65(51.5%)	37(29.3%)	8(6.3%)	16(12.6%)	<0.001
	Active metal 30 (15%)	9(30%)	17(56.6%)	0	4(13.3%)	
	Zirconia 0	0	0	0	0	
	Glass fibre 44 (22%)	4(9%)	36(81.8%)	4(9%)	0	
Type of post for abutment tooth	Metal 109 (54.5%)	48(44.0%)	41(37.6%)	8(7.3%)	12(11%)	<0.001
	Active metal 21 (10.5%)	13(61.9%)	4(19%)	0	4(19%)	
	Zirconia 4 (2%)	4	0	0	0	
	Glass fibre 66 (33%)	13(19.6%)	45(68.1%)	4(6%)	4(6%)	
Luting agent for metal post	Zinc phosphate 12 (6%)	4(33.3%)	8(66.6%)	0	0	0.06
	Composite 50 (25%)	17(34%)	29(58%)	0	4(8%)	
	Glass ionomer 138 (69%)	57(41.3%)	53(38.4%)	12(8.6%)	16(11.5%)	
	Other 0	0	0	0	0	
Luting agent for glass fibre post	Zinc phosphate 9 (4.5%)	0	9	0	0	<0.001
	Composite 151 (75.5%)	58(38.4%)	73(48.3%)	12(7.9%)	8(5.2%)	
	Glass ionomer 40 (20%)	20(50%)	8(20%)	0	12(30%)	
	Other 0	0	0	0	0	
Core material for anterior tooth	Composite 188 (94%)	74(39.3%)	82(43.6%)	12(6.3%)	20(10.6%)	0.32
	GIC 12 (6%)	4(33.3%)	8(66.6%)	0	0	
	Amalgam 0	0	0	0	0	
	Other 0	0	0	0	0	

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Vignette	Responses n (%)		Experience n (%)			P value
Core material for posterior tooth	Composite 135 (67.5%)	53(39.2%)	58(42.9%)	4(2.9%)	20(14.8%)	<0.001
	GIC 24 (12%)	8(33.3%)	16(66.6%)	0	0	
	Amalgam 41 (20.5%)	17(41.4%)	16(39%)	8(19.5%)	0	
	Other (0)	0	0	0	0	
Vignette	Responses (n) [%]	Experience n (%)	P value			
		1-5 years	6-10 years	11-15 years	>15 years	
Function of post	Reinforce tooth structure (87) [43.5%]	46 (52.8%)	33 (37.9%)	8 (9.1%)	0	< 0.001
	Reduce fracture (4) [2%]	0	4 (100%)	0	0	
	Retain core (101) [50.5%]	32 (31.6%)	45 (44.5%)	4 (3.9%)	20 (19.8%)	
	Stress distribution (8) [4%]	0	8(100%)	0	0	
Remaining walls ideal for post placement	3 walls (0)	0	0	0	0	<0.001
	2 walls (36) [18%]	20 (55.5%)	4(11.1%)	12(33.3%)	0	
	One wall (44) [22%]	8 (18.1%)	20(45.4%)	0	16(36.3%)	
	No wall (120) [60%]	50 (41.6%)	66 (55%)	0	4(3.3%)	
Length of post	1/3rd of root (41) [20.5%]	17(41.4)	20(48.7%)	0	4(9.7%)	<0.001
	2/3rd of root (125) [62.5%]	61(48.8%)	40(32%)	12(9.6%)	12(9.6%)	
	½ of root (25) [12.5%]	0	21(84%)	0	4(16%)	
	Doesn't matter (9) [4.5%]	0	9(100%)	0	0	
Type of post for anterior tooth	Metal (8) [4%]	0	8(100%)	0	0	<0.001
	Active metal (13) [6.5%]	0	9(69.2%)	0	4(30.7%)	
	Zirconia (4) [2%]	4(100%)	0	0	0	
	Glass fibre (175) [87.5%]	74(42.2%)	73(41.7%)	12(6.8%)	16(9.1%)	
Type of post for posterior tooth	Metal (126) [63%]	65(51.5%)	37(29.3%)	8(6.3%)	16(12.6%)	<0.001
	Active metal (30) [15%]	9(30%)	17(56.6%)	0	4(13.3%)	
	Zirconia (0)	0	0	0	0	
	Glass fibre (44) [22%]	4(9%)	36(81.8%)	4(9%)	0	
Type of post for abutment tooth	Metal (109) [54.5%]	48(44.0%)	41(37.6%)	8(7.3%)	12(11%)	<0.001
	Active metal (21) [10.5%]	13(61.9%)	4(19%)	0	4(19%)	
	Zirconia (4) [2%]	4	0	0	0	
	Glass fibre (66) [33%]	13(19.6%)	45(68.1%)	4(6%)	4(6%)	
Luting agent for metal post	Zinc phosphate (12) [6%]	4(33.3%)	8(66.6%)	0	0	0.06
	Composite (50) [25%]	17(34%)	29(58%)	0	4(8%)	
	Glass ionomer (138) [69%]	57(41.3%)	53(38.4%)	12(8.6%)	16(11.5%)	

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Vignette	Responses n (%)		Experience n (%)			P value
	Other (0)	0	0	0	0	
Luting agent for glass fibre post	Zinc phosphate (9) [4.5%]	0	9	0	0	<0.001
	Composite (151) [75.5%]	58(38.4%)	73(48.3%)	12(7.9%)	8(5.2%)	
	Glass ionomer (40) [20%]	20(50%)	8(20%)	0	12(30%)	
	Other (0)	0	0	0	0	
Core material for anterior tooth	Composite (188) [94%]	74(39.3%)	82(43.6%)	12(6.3%)	20(10.6%)	0.32
	GIC (12) [6%]	4(33.3%)	8(66.6%)	0	0	
	Amalgam (0)	0	0	0	0	
	Other (0)	0	0	0	0	
Core material for posterior tooth	Composite (135) [67.5%]	53(39.2%)	58(42.9%)	4(2.9%)	20(14.8%)	<0.001
	GIC (24) [12%]	8(33.3%)	16(66.6%)	0	0	
	Amalgam (41) [20.5%]	17(41.4%)	16(39%)	8(19.5%)	0	
	Other (0)	0	0	0	0	

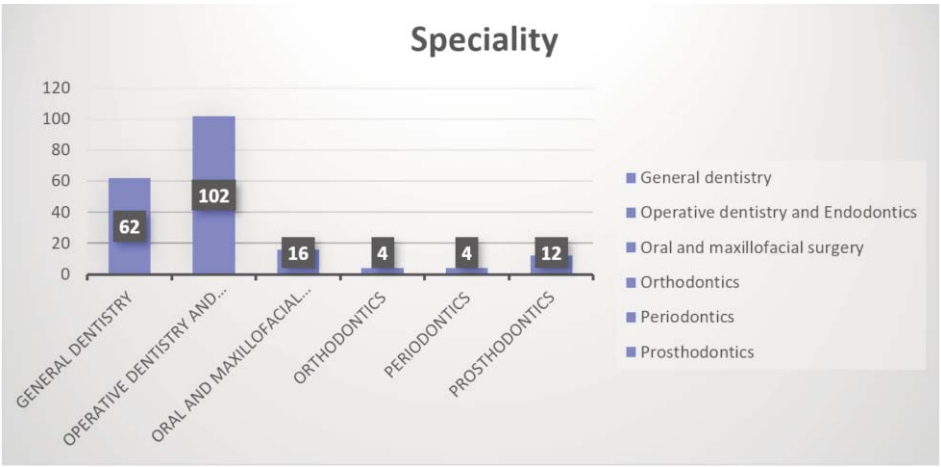

Figure-1: Distribution of participants of the study according to their specialties

the study and selected via consecutive random sampling, whereas dentists from other cities and those with less than one year experience were excluded. The study was carried out between March 1, 2022 to June 30, 2022. Sample size was calculated using a WHO calculator for finite population (5000 i.e., average number of dentists as per PMDC communication) with confidence interval of 95% and came out to be 257, out of which 200 responses were received.[8] A questionnaire was created using AMEE Guide No 87 and questions were modified with the help of previously published literature.[6,8] The questionnaire was submitted to content specialist and cognitive interviews were also conducted with a panel of dentists for questionnaire content verification. Minor corrections to the questionnaire were done and the final questionnaire was pilot tested on 10% of the study population. The questionnaire was divided into two parts. The first part included socio demographic questions such as age, sex, gender, practice setup, qualification (general dentist, post graduate trainee, and specialist), professional work experience, and specialty in dentistry. The second part included information regarding the use of endodontic posts, its appropriate function, clinical indications, length, number of posts used on average, preference of endodontic post in anterior, posterior, or abutment teeth, and lastly the restorative material preferred for coronal restoration. The questionnaire was then transferred to google forms and sent to dentists via social media platforms. Data was entered and analysed using SPSS version 23. Means and percentages were calculated for variables like age and years of practice, whereas gender and the items of questionnaire were evaluated for frequencies and percentages. Chi-square test was performed to correlate the responses of the participants to the years of practice of dentists.

Two hundred dentists participated in the survey and their responses are detailed in table1 and figure 1 respectively, out of which 70 (35%) were general dentists, 68 (34%)

were post graduate trainees, and 62 (31%) were consultants in different specialties. The dentists surveyed mostly belonged to Operative Dentistry and Endodontics 102 (51%) with general dentists were the second common group. Majority 78 (39%) of the dentists were practicing in a tertiary care hospital. Most of the dentists averaged using 0-5 posts per month in root canal treated anterior 143 (71.5%), posterior 155 (77.5%), or even abutment teeth 164 (82%) with majority of users belonging to the clinical experience between 6-10 years.

When asked about the function of endodontic post 100 (50%) of dentists responded with 'to retain the core material' whereas around 88 (44%) believed that it helped to 'reinforce the remaining tooth structure'. About 125 (62.5%) believed the ideal length of endodontic post to be '2/3rd of the length of the root', whereas around 40 (20%) believed that it should be around '1/3rd of the length of the root'. About 120 (60%) believed the common indication for using endodontic post was 'when no tooth walls are present but a ferrule of 2mm of dental hard tissue remains', followed by 44 (22%) stating 'when only one coronal wall remains' and 36 (18%) 'when two coronal wall remains'. Glass fibre posts were widely used in anterior teeth 175 (87.5%) whereas for posterior teeth 126 (63%) of the study population preferred metal posts and 44 (22%) opted for glass fibre posts. For endodontically treated teeth that were to be used as abutment for fixed prosthesis majority 110 (55%) preferred metal posts, whereas 66(33%) used glass fibre posts in such teeth. The luting agent of choice for glass fibre posts was composite/resin-based cement by 152 (76%) of the users, whereas 40 (20%) preferred GIC for intracanal bonding of the post. For metallic posts GIC was the preferred choice of 138 (69%) of individuals, whereas 50 (25%) preferred composite or resin-based cement for luting of endodontic posts. Composite was the material of choice for intra-coronal restoration in anterior teeth for 188 (94%) with 12 (6%) opting for GIC. Posterior teeth were restored with composite restoration by 135 (67.5%) of the surveyed dentists, 41 (20.5%) used amalgam as the core material, whereas 24 (12%) used GIC as the restoration of endodontically treated tooth, followed by crowns. The study also revealed that the knowledge of practitioners regarding function of posts, tooth structure availability for placement of posts, length of the post, type of the posts and the core materials used for anterior, posterior and abutment teeth were statistically significant in relation to years of experience.

This study has some limitations as it only focussed on the usage of pre-fabricated posts mainly glass fibre posts and metal posts. Moreover, the study was carried out in twin cities so the results could not be generalised.

Conclusion

Within the limitations of the study, it was concluded that the main function of the endodontic post is to retain the core material and that endodontic posts should be used as an exception rather than the rule. The commonest indication is when there is at least 2mm of ferrule present and the optimal post length is 2/3rd of the root canal. Glass fibre posts were chosen as the endodontic posts of choice in anterior teeth, whereas metal posts were preferred in posterior teeth. Resin based cement was used with glass fibre posts whereas GIC was the cement of choice with metallic posts. Composite resin was the preferred core material followed by amalgam.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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