

The Awareness and Practices of Dentists in Urban Bangalore Regarding the Management of Endodontically Treated Teeth

Kiran Kumar N¹ Mohammed Salman. K^{2*} Savitha B Naik³ Seema Merwade⁴ Biji Brigit K⁵ Neha Jain⁶

¹Associate Professor, Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

²PG Student, Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

³Associate Professor, Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

⁴Associate Professor, Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

⁵Assistant Professor, Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

⁶PG Student, Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

ABSTRACT

Aim: To evaluate the awareness and practices followed by dentists in urban areas of Bangalore to restore endodontically treated teeth (ETT)

Materials and Methods: The participants were categorized as General Dentists, Prosthodontists and Endodontists. The study was conducted by distributing specially designed questionnaire containing 24 questions. Only those practitioners who were involved in the restoration of more than 30 ETT annually were considered for further evaluation. 505 questionnaires were handed over to various dental practitioners across Bangalore.

Result: Among 505 distributed questionnaires 454 were returned and the response rate of the study was 89%. 52 responses were omitted as those practitioners didn't meet the criteria of restoring 30 endodontically treated teeth annually. Among the remaining 402, Endodontists and Prosthodontists were more aware about the significance of ferrule in post endodontic restoration. Majority of general practitioners prefer pre-fabricated post over custom cast post.

Conclusion: General practitioners and specialized dentists differed in the levels of knowledge regarding the materials and techniques used in restoring ETT. Since the concepts among practitioners in restoring ETT is still controversial and proper restoration of such teeth is detrimental for good prognosis, it is mandatory that the practitioners are aware of the new philosophies and techniques in this field.

Keywords: Dentist awareness, ferrule, post and core, post endodontic restoration.

INTRODUCTION

Endodontic treatment is used regularly in contemporary dental practice, but a satisfactory restoration is the key to success after the root canal therapy.[1] The changes that accompany root canal therapy and the thickness of the residual walls and

cusps determine the selection of the post-endodontic restorative material and procedures.[2] A combination of a well sealed coronal restoration and endodontic treatment is shown to have reduced periradicular inflammatory lesions. Apical periodontal health after endodontic treatment depends significantly more on the post-endodontic

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*Correspondence Dr. Mohammed Salman K.

Department of Conservative Dentistry and Endodontics, Government Dental College and Research Institute, Bangalore, India.

Email: salmankp26@gmail.com

restoration than the technical quality of the endodontic treatment.[3] Due to the ever increasing variety of new materials and techniques to be used for the post endodontic restoration, the choice to be made has become more complex and controversial.

Therefore, the aim of this study was to survey the general practitioners, prosthodontists and endodontists in urban areas of Bangalore to know whether the planning of post endodontic restoration was an integral part of their daily practice.

MATERIALS AND METHODS

This cross sectional study was carried out in September 2018. A questionnaire was fabricated with 24 questions and 505 such questionnaires were distributed to dental practitioners across Bangalore including those employed in various dental colleges. Only those practitioners dealing with rehabilitation of more than 30 ETT per year were asked to complete the survey form and others were asked to stop at the sixth question. The participants were categorized into Group (A) General dentist, Group (B) Prosthodontist, Group (C) Endodontists respectively. The other specialty practitioners were excluded from the study. The questionnaires were collected immediately and the statistical analysis was done using statistical package for social sciences (SPSS Version 22 Inc.). Participants' knowledge was compared using mean, SD and Chi-square test.

RESULTS

Among 505 questionnaire send 454 were only returned, showing 89% response rate. The ages of the respondents ranged from 24 to 54 years, with a mean age of 39 years. 292 men (64%) and 162 women (36%) were identified in the survey. 402 dentists (89%) reported involvement in the treatment or restoration of more than 30 endodontically treated teeth per year (question 7), whereas 52 respondents (11%) didn't involve in the restoration of more than 30 ETT per year. 200 surveys, or 50% of the total, were collected from general-practitioners, 98 (24%) from prosthodontists, 102(26%) from endodontists.

With regard to philosophical concepts, 77 respondents (19%) believed that every

endodontically treated tooth must receive a post, while 325 respondents (81%) did not. More than half (244 respondents or 61.7%) consider that a post would reinforce an endodontically treated tooth. One fourth of the respondents (25%) placed or recommended one-piece dowel crowns (Richmond crowns). 14% was not familiar with the concept of the 'ferrule effect'. Of the 402 dentists who responded to the question regarding the method of development of the ferrule there was a significant difference among the opinion for incorporating the ferrule effect, 32% (132 respondents) indicated that the ferrule should come from the cemented artificial crown. 21% respondents (88) indicated their belief in the use of a bevel as a component of the cast core for developing a ferrule, 44% (177) reported that they believed in incorporating both approaches, and 1.2%(5) answered 'no opinion' in their questionnaire.

20% respondents (81) are in an opinion that the post should be as long as practical, and 21% respondents (86) indicated that the post can be made to two thirds of the length of the root in bone. 18% (73) saying that the length of the post can be equal the length of the clinical crown. By contrast, 20% (80) reported that preserving only 3 mm of obturating material should serve as a guideline while preparing post space, while 82% respondents (328) are in favour of the opinion that 5 mm of obturating material should serve as the guideline.

There is a statistically significant difference in the type of post used among general practitioner, prosthodontist, and endodontist. 62% of general practitioners prefer pre-fabricated post, and 56% endodontists also prefer the same. But only 45% of prosthodontists prefer prefabricated posts.

There is no statistically significant difference among the type of pre-fabricated post using by different groups. More than half of the population among the respondent prefer parallel sided serrated post. 27% prefer tapered smooth post, 18% prefer screw post.

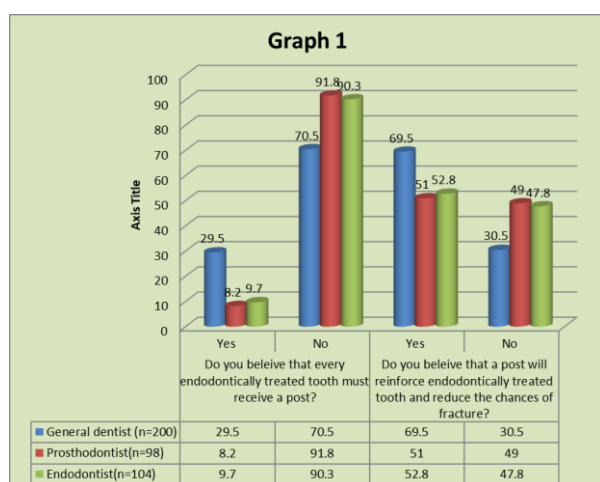
81% of the respondent uses composite resins as the core buildup material after the post placement, there is no statistical difference among general dentist, prosthodontist and endodontist in terms of core-build up material.

Table 1: Questionnaire and related answers.

	Question			General dentist n=200 (%)	Prosthodontist n=98(%)	Endodontist n=104(%)	P value
1	Do you beleive that every endodontically treated tooth must receive a post?	Yes		59(29.5)	8(8.2)	10(9.7)	0.0001* (X ² =25.21)
		No		141(70.5)	90(91.8)	94(90.3)	
2	Do you beleive that a post will reinforce endodontically treated tooth and reduce the chances of fracture?	Yes		139(69.5)	50(51)	55(52.8)	0.007* (X ² =14.37)
		No		61(30.5)	48(49)	49(47.2)	
3	How ferrule effect should be developed	Component of cast core		66(33)	2(2.1)	20(19.2)	0.000* (X ² =58.92)
		With artificial crown		64(32)	48(48.9)	20(19.2)	
		Both approaches		66(33)	47(47.9)	64(61.6)	
		No opinion		4(2)	1(1.1)	0	
4	Use or recommend one-piece dowel crown?	Yes		76(38)	18(18.4)	8(7.7)	0.000* (X ² =36.55)
		No		124(62)	80(81.6)	96(92.3)	
5	Removing the obturating material	Rotary reamers	Yes	198(99)	98(100)	103(99)	0.61
			No	2(1)	0	1(1)	(X ² =0.97)
		Hand reamers	Yes	3(1.5)	1(1.1)	2(2)	0.86
			No	197(98.5)	97(98.9)	102(98)	(X ² =0.28)
		Heated instrument	Yes	30(15)	20(20.4)	46(44.2)	0.000* (X ² =33.02)
			No	170(85)	78(79.6)	58(55.8)	
		Solvents	Yes	28(14)	9(9.2)	33(31.7)	0.000* (X ² =21.06)
			No	172(86)	89(90.8)	71(68.3)	
6	Length of post advised	As long as practical.	Yes	45(22.5)	15(15.3)	21(20.8)	0.34 (X ² =2.11)
			No	155(77.5)	83(84.7)	83(79.8)	
		Equal length of clinical crown	Yes	22(11)	20(20.5)	31(29.8)	0.0002* (X ² =16.71)
			No	178(89)	78(79.5)	73(70.2)	
		One half	Yes	33(16.5)	22(22.5)	31(29.8)	
			No				

		length of root	No	167(83.5)	76(77.5)	73(70.2)	0.026* (X ² =7.291)
		Two thirds length of root	Yes	110(55)	81(82.6)	89(85.6)	0.000* (X ² =39.59)
			No	90(45)	18(17.4)	15(14.4)	
		Preserve 3 mm of obturator material	Yes	40(20)	8(8.2)	32(30.8)	0.0002* (X ² =16.71)
			No	160(80)	90(91.8)	72(69.2)	
7	What type of post do you use(or recommend)	Pre fabricated post only	Yes	170(85)	78(79.5)	80(76.9)	0.190 (X ² =3.317)
			No	30(15)	20(20.5)	24(23.1)	
		Cast post and core only		30(15)	30(30.6)	31(29.9)	
8	If you use(or recommend) pre fabricated post,which type do you use(or recommend) most often (more than 50% of the time)?	Both		46(23)	24(24.6)	14(14.3)	0.0016* (X ² =17.32)
		Parallel-sided serrated(eg;para- post)		124(62)	44(44.8)	58(55.8)	
		Tapered smooth(eg;kerrendo- post)		30(15)	30(30.6)	31(29.9)	
		Screwpost(eg;kurer post)		46(23)	24(24.6)	14(14.3)	
		Split flexible post(eg:flexi-post)		46(23)	24(24.6)	14(14.3)	
9	If you use (or recommend)prefabricated posts, which material do you use(or recommend)most often(more than 50% of time)as a core build-up?	Others		4(2)	3(3.1)	4(4.8)	0.459 (X ² =7.739)
		Amalgam		0	0	0	
		Composite resin		164(82)	71(72.4)	91(87.5)	
		GIC		22(11)	19(19.4)	10(9.6)	
		Resin Modified glass Ionomers (Ketac - molar)		14(7)	8(8.2)	2(1.9)	0.104 (X ² =10.51)

10	If you use (or recommend) cast posts and cores, which alloy do you use (or recommend) most often?	Gold Alloy	0	0	0	0.132 ($\chi^2=9.827$)
		Silver palladium	0	0	0	
		Palladium silver alloy	188(94)	98(100)	102(98.1)	
		Base metal	12(6)	0	2(1.9)	
11	If you use (or recommend) cast posts and core, do you use (or recommend)	Direct pattern technique (wax or resin)	8(4)	30(30.7)	20(19.3)	0.0002* ($\chi^2=33.44$)
		Indirect technique (impression method)	120(60)	44(44.9)	56(53.9)	
		Both the techniques	72(36)	24(24.4)	28(26.8)	
12	What type of cement do you use (or recommend) most often to cement a post?	Zinc Phosphate	0	8(8.2)	2(1.9)	0.0001* ($\chi^2=38.06$)
		Poly carboxylate	0	0	0	
		Glass Ionomer cement	158(79)	26(26.5)	44(42.3)	
		Resin cement	42(21)	64(65.3)	58(55.8)	
13	How do you place (or recommend placement of) cement into the canal?	Apply cement on post only	22(11)	8(8.2)	11(10.6)	0.149 ($\chi^2=9.27$)
		Apply cement in canals with probe	0	0	0	
		Apply cement in canal with lentulospiral paste	122(61)	49(50)	48(46.1)	
		Apply on post and canal	56(28)	41(41.8)	44(42.3)	



97% of the people in this study uses base metal as the material for casting and 3% people they do not know about the metal used for casting.

There is a statistically significant difference among the all the three groups for the technique used for the fabrication of cast post and core, 60% of general

practitioners prefer direct pattern technique, where as 45% of the prosthodontist and 54% endodontist prefer indirect technique.

There are statistically significant differences in the cement using for cementing the post. 79% of general dentist prefer Glass Ionomer Cement as the cement, while 65% prosthodontist and 55% of endodontist prefer resin cement for cementing the post. 8% of prosthodontist prefer zinc-phosphate as the cement for cementing the post.

There was no significant difference among the three different groups in terms technique used for applying cement on canal and post during cementation. 54% of the respondents prefer applying the cement using lentulospirals and 35% people prefer applying cement on canal and post manually together.

DISCUSSION

The response rate of this study was 89% showing that it can be considered as a reliable method to evaluate the basic knowledge of dentists in urban areas of Bangalore in restoring endodontically treated teeth.

This study found that 51% of the prosthodontists believed that a post would reinforce an endodontically treated tooth. This finding is in par with the study conducted by Morgano et al (1994), which found that 59% of US general practitioners also believed the same.[4] In another study, 43% of American Board-certified prosthodontists in the US held the same belief. Evidence that posts do not reinforce endodontically treated teeth and its only for retention of core is not new[5]; however, this topic has received considerable attention during the last 5 years. Consequently it could be assumed that more dentists would be aware of this concept today, compared to the early 1990s when the US survey was conducted.[4]

85% of the respondents were familiar with the concept of a ferrule, and only 17% believed that the ferrule should come from the cemented artificial crown. Nevertheless, the ferrule has a profound effect on the prognosis of the restored endodontically treated tooth.[6] When a post is placed in the root, it provides retention for the core, which in turn provides retentive and resistance form for the crown. However, the post can cause the root to fracture by transferring the occlusal forces to the center of the root. The cemented artificial crown encircles the remaining tooth structure, counteracting the forces generated by the post.[7] In addition, the ferrule effect minimizes the stresses in the cement seal of the artificial crown and avoid stress concentration at the junction of the post and the core.[8] This ferrule effect is difficult to create with limited remaining coronal tooth structure, needing an orthodontic extrusion or preprosthetic surgical crown lengthening to avoid violating the biological width.[9] 22% believed that the ferrule effect could be obtained from a contrabevel as a component of the core itself. 37% of respondents believed that ferrule should be a combination of core's contrabevel and the ferrule effect from the artificial crown. Most of the studies suggest that there is no advantage of a core contrabevel, [10] and this core contrabevel design may be detrimental.[11]

One fourth of the respondents used one-piece dowel crown, which is now considered obsolete. 81% of the prosthodontists did not use one piece dowel crown. The one-piece dowel crown has fabrication difficulties as there are no specific methods to fabricate an internally passively fitting post and externally binding crown. An investment which show less expansion to fabricate a passively fitting post and the investment material promoting more expansion is needed for an oversized crown is needed. Another problem associated with this is long term prognosis of the teeth will be affected, if in case of any reason the dentist wants to remove the dowel crown it has a high chance to break the tooth, because to remove the crown which is casted along with post needs more force compared to remove a separate crown and post, so that the remaining tooth structure will be devoid of any damage.

One of the major factor determining the prognosis of the post-restored teeth is the length of the post placed inside the canal. 20% people believe that post length should be as much as possible because increasing the post length, increases the prognosis of restoration; provided the apical seal should be maintained.[12] According to literature leaving 4-5 mm of apical gutta-percha is desired to prevent the apical seal of the endodontically treated tooth.[13] 20% people agree that 3 mm of apical GP should be preserved during post space preparation and 80% respondents had answered according to the literature.

More than 50% of the respondents prefer using Parallel-sided serrated posts, 28% people prefer tapered smooth posts and 18% people prefer screw post, but according to study by Naumann et al it was concluded that amount of residual tooth structure and type of loading are determining factors for the selection of post to be used.[14]

More than 50% of the respondents in this study prefer using prefabricated posts. The reason for the same may be to save the clinical time and to reduce the number of patient appointments. 21% of the respondents use either cast post or prefabricated post depending on the cases and special indications if any. Studies have mentioned that cast posts are indicated when there is significant loss of tooth structure and for oval canals as they fit better with

ideal connection to the core. However metal posts are aesthetically inferior when compared to nonmetal posts and have a higher risk of root fracture because of their increased stiffness.[15] The technique for fabrication of cast post varied significantly among three groups. 60% of the general practitioners, 45% of prosthodontists and 54% of endodontists preferred indirect technique for cast post preparation. This may save the chairside time for the patient and doctor. The indirect method is more suitable for multiple canals, whereas the direct technique is suitable for single canals.[16] More than 50% of the respondents prefer to apply the cement using lentulospirals, and 35% prefer applying the cement manually both in canals and posts. Study by Goldman et al shown that the application of cement with lentulospiral shows more uniform distribution of cement and it will increase the bond strength of the post.[17]

CONCLUSION

Almost half respondents believed that post reinforces the root of an endodontically treated tooth. Most of the respondents didn't advice or use the obsolete one piece dowel crown. Respondents were aware that the ferrule prevents the fracture of the endodontically treated tooth. For the preparation of post space, rotary reamers were the most commonly used technique. Respondents were aware about the importance of maintaining the apical seal while removing the GP for post space preparation. To save clinical time, majority of dentists use prefabricated post and among this parallel sided serrated was the commonly used one. Most of the dentists preferred composite resin as the core-build up material followed by GIC. Many were aware about the metal used for fabrication of custom cast post and core. Specialist doctors (prosthodontist and endodontist) preferred resin cements for cementation of the post. Maximum number of respondents applies the cement using lentulospiral which has been proven as the most effective method. There is a dire need for more seminars and workshops, in order to broaden our horizons on the knowledge of the emerging philosophies and techniques of restoring ETT.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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