ORIGINAL RESEARCH PAPER

Volume-8 | Issue-4 | April-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

THE PERSPECTIVE OF DENTAL PRACTITIONERS ABOUT POST-ENDODONTIC RESTORATION: A QUESTIONNAIRE-BASED SURVEY CONDUCTED IN CENTRAL INDIA.

Dental Science

Dr. Neha Mundhada* Post Graduate,VSPM Dental College And Research Centre, Digdoh hills,Hingna Road,Nagpur-440019 *Corresponding Author

Dr. Chetana Makade Associate Professor, VSPM Dental College And Research Centre, Digdoh hills,Hingna Road,Nagpur-440019

Dr. Pratima Shenoi Head of Department,VSPM Dental College And Research Centre, Digdoh hills,Hingna Road,Nagpur-440019

Dr. Deepashri Tekam Post Graduate, VSPM Dental College And Research Centre, Digdoh hills,Hingna Road,Nagpur-440019

ABSTRACT

Background: The restoration of endodontically treated teeth(ETT)for rehabilitation as a functional unit of masticatory apparatus is one of the most challenging situationsfor dental practitioners. It may require a multidisciplinary approach with varied advances in material science and techniques. This survey is aimed to evaluate the level of awareness,current knowledge and opinion towards the post-endodontic restorations among dental practitioners in Central India.

Methodology: A descriptive observational study was conducted using Google Doc among 160 dental practitioners across Central India with a response rate of 95.6%.

Results: The survey revealed that the most preferred material for core build-up was composite resin (60-82%). Full coverage restoration was the most frequently preferred (64%-68%) final restoration.The endodontic cause was the most frequent reason for RCT failure according to 44.9% of practitioners.

Conclusion: Though the practitioners were having knowledge about post-endodontic restorations, they were unaware of the recent conservative approaches.

KEYWORDS

Composite, Post, endodontically treated teeth (ETT)

INTRODUCTION

The success of root canal treatment lies in the extirpation of pulp, thorough cleaning and shaping, 3-D obturation followed by an appropriate choice of post-endodontic restorations.[1] Endodontically treated teeth(ETT) are usually compromised aesthetically and structurally owing to loss of tooth vitality, tooth structure due to caries, iatrogenic cavity preparation, dehydration, loss of collagen cross-linking, the effect of intracanal irrigants and medicaments.[2]

To make the pulpless tooth a functional and integral part of the oral masticatory apparatus, successful endodontic treatment has to be accomplished with an appropriate choice of post-endodontic restorations.[3]The strength of ETT depends upon the bulk of the remaining sound dentin. It is essential to provide a restoration allowing cuspal coverage as soon as possible following completion of the root canal treatment as an apical seal and coronal seal are equally important for the predictable success of treatment.[1] Ray HA et al in 1995 concluded that more emphasis should be placed on coronal restoration as a means to secure the results of the endodontic treatment.[4]

In the case of endodontically treated **anterior teeth** with relatively minimal coronal damage composite resin or Glass Ionomer Cement restoration is indicated.[5,6] Tooth with moderate coronal damage requires composite resin restoration with partial coverage crown. In cases of significant coronal damage with loss of marginal or incisal edges can be restored with veneers, full crowns or in combination with custom-made/ prefabricated post and cores.[3]

The endodontically treated **posterior teeth** with only minimal access cavities can be restored with amalgam, composite resin or cast metal/ceramic onlay.[7]Whereas moderate tooth destruction can be restored with amalgam coronal-radicular core or resin composite core followed by a 3/4th crown, 7/8th crown or full coverage prosthesis.[3]

According to **Dennis Fasbinder** in **2017**, Endocrown is a more conservative option to maintain maximum cervical tooth structure by utilizing the internal wall of the pulp chamber. The extensive loss of tooth structure requires custom-made or prefabricated posts and cores with effective ferrule, followed by full coverage crown.[8] Recently, a new onlay design with a post extension indicated for an endodontically treated single rooted tooth in order to enhance the retention of the onlay and protect the tooth against occlusal forces called Sharonlay.[1]

Today there is a paradigm shift towards conservative treatment options; to preserve remaining tooth structure after root canal treatment.There are different post systems available, even after knowing the importance of post-placement practitioner rarely prefers to place post. No study has been conducted yet depending upon different conservative post-endodontic restorative options in central India. This study thus intends to elicit the information regarding the attitude, current approaches and techniques used for the restoration of ETT among dental practitioners in Central India.

Methodology

A descriptive observational study was designed and approved by the Institutional Ethical Committee.A questionnaire proforma was validated consisting of 18 single answer multiple choice type questions.This questionnaire was sent to 160 practitioners via Google Docs through mail and responses were collected. The questionnaire comprised of choice of restorative material for core build-up and final restoration with varying teeth type, a frequent cause of endodontic failure perceived by practitioners.Lastly, the use of different post types along with the effect of the ferrule and finish line placement.

RESULTS

Out of 160 practitioners who received the questionnaires, 153 participated in the study so the response rate is 95.6%. Table 1. gives general information regarding practitioners and table 2. shows the response of dental practitioners regarding post-endodontic restoration.

Table 1: General information of practitioners

1.Working as	
Speciality practitioner	28.7%
Clinician	22.7%
Academician	20.7%
Clinician and academician	16%
General practitioners	12%

2. Clinical experience	
Practitioners	Years of practice
5	<1
63	3-5
70	5-10
15	>10
3.Average number of ETT/month	
Practitioners	Number of treated teeth
15	<10
40	10-25
92	25-50
6	>50

Table 2: Response of dental practitioners related to post-endodontic restoration

1.How long do you usually wait to provide the final restoration after completion of root canal treatment?			
Duration	Practitioner		
Less than a week	**79(53%)**		
1 -2 weeks	64(43%)		
1 month	6(4%)		
3 month	0		
2.Which material do you prefer for core build-up procedures?			
Type of teeth	**Incisors**	**Canine**	**Premolars/molars**
Material	**Number of practitioners(%)**		
Composite	**122(81.9%)**	**110(74.8%)**	**88(59.1%)**
Glass ionomer cement	21(14.1%)	23(15.6%)	40(26.8%)
Cast core	6(4%)	14(9.5%)	21(14.1%)
3.What type of final endodontic restoration do you routinely provide for root canal treated anterior teeth?			
Direct restoration (Amalgam/Composite/GIC/other)	35(23.5%)		
Metal-ceramic crown	34(22.8%)		
All ceramic crown	**68(45.6%)**		
Ceramic veneer	7(4.7%)		
Other	5(3.4%)		
4.What type of final endodontic restoration do you routinely provide for root canal treated posterior teeth?			
Direct restoration (Amalgam/Composite/GIC/other)	27(18.2%)		
Onlays	10(6.8%)		
Overlays	1(0.7%)		
Inlay	2(1.4%)		
Richmonds crown	1(0.7%)		
Sharonlay	1(0.7%)		
Full crown	**95(64.2%)**		
Endocrowns	7(4.7%)		
Post and core	4(2.7%)		
5.Which is the most frequent cause of failure of ETT?			
Loss of retention	20(13.6%)		
Endodontic failure	**66(44.9%)**		
Crown fracture	43(29.3%)		
Root fracture	11(7.5%)		
No failure	7(4.8%)		
6.Do you believe that post reinforces ETT and reduces fracture probability?			
Yes, definitely	41(27.9%)		
Yes,with adhesive luting	**52(35.4%)**		
Yes,with conventional luting	17(11.6%)		
No	19(12.9%)		
Not specified	18(12.2%)		
7.Do you routinely place a post in ETT prior to crowning?			
Always	12(8.3%)		
Most of the time	46(31.9%)		
Rare	**76(52.8%)**		
Never	10(6.9%)		
8.Do you believe that Ferule effect can increase fracture resistance in ETT?			
Always	**61(41.8%)**		
Sometimes	57(39%)		
Never	4(2.7%)		
Not sure	24(16.4%)		
9.Do you believe that reducing the level of the finishing line below the core foundation following post cementation increases the fracture resistance?			
Yes	**79(54.5%)**		
No	23(15.9%)		
Not sure	43(29.7%)		
10.What type of post do you use most often in the restoration?			
	Incisors	**Canine**	**Premolars /molars**
a. Cast precious	37(26.6%)	27(19.4%)	27(19.4%)
b. Cast non-precious	18(12.9%)	19(13.7%)	21(15.1%)

c. Prefabricated	**84(60.4%)**	**93(66.9%)**	**91(65.5%)**
11.Which type of post do you prefer from a longevity point of view?			
Prefabricated post	62(44.3%)		
Cast post	**72(51.4%)**		
Other	6(4.3%)		
12.Which shape of prefabricated post do you prefer for retention purpose?			
Parallel sided post	24(17.5%)		
Tapered post	34(24.8%)		
Parallel tapered post	**58(42.3%)**		
Screw type	15(10.9%)		
Split flexible post	6(4.4%)		
13.Which type of post enhance the esthetic outcome especially with composite build-ups?			
Gold plated metal post	10(7.1%)		
Metal post(Silver colour)	20(14.3%)		
Fibre post	**102(72.9%)**		
Other	8(5.7%)		
14.What is the most appropriate length of the post?			
<3mm	15(10.6%)		
4-5mm	36(25.5%)		
2/3rd of root length	**86(61%)**		
Same length as crown	4(2.8%)		
15.What length of GP should remain in the apical third of root canal for maintaining an apical seal for post placement?			
<3mm	41(29.3%)		
4-5mm	**89(63.6%)**		
>5mm	10(7.1%)		
16.What do you commonly use for rinsing canal before post cementation?			
Saline	**55(39%)**		
Sodium hypochlorite	48(34%)		
EDTA	25(17.7%)		
Chlorhexidine	13(9.2%)		
17.What type of luting cement do you commonly use to lute posts?			
Zinc phosphate	28(19.9%)		
Glass ionomer	48(34%)		
Poly carboxylate cement	13(9.2%)		
Resin cement	**52(36.9%)**		
18.Do you routinely take a radiograph after the placement of a post?			
Always	**112(78.9%)**		
Sometimes	29(20.4%)		
Never	1(0.7%)		

DISCUSSION

According to the study given by Torabinejad et al (1990),50% of single-rooted obturated teeth, were contaminated with bacteria at the tooth tissue/root filling interface along the entire length of the root after 19 days.[9]This proves that any delay in providing a durable coronal seal may affect the success of root canal treatment and thus increases the risk of endodontic failure.[10]In our study the post-endodontic restoration is normally undertaken in less than a week after completion of root canal treatment by 53% practitioners while within 1-2weeks by 43% practitioners. Similar findings were reported from a survey conducted at Manchester in 2002 by seow et al.[11]

Core is like 'Build-up' which contributes significantly to the strength and retentiveness of the crown preparation.In the present study,composite is the choice of material for core build up by 59.1-81.9% practitioners with varying teeth type.In the United States study (1994), 52% of practitioners were found to prefer amalgam for core build-up procedures in posterior teeth. A survey conducted by Hussey et al (1995) shows that GIC (32%) and cermet (8%) together were the most popular core build-up materials, followed by amalgam (35%).[12] This is in contrast to findings from the Swedish survey conducted in 2001, where only 3% of practitioners were found to use amalgam.[13] While according to the study conducted in Manchester composite resins tended to be used in anterior teeth by 51% and amalgam in posterior teeth by 44% practitioners.[11]

Selection of a final restoration for an ETT should be taken into account depending on the amount and quality of remaining tooth structure,occlusalfactors,aesthetics,consideration of cost and anticipated clinical longevity.Recent literature suggest several options for ETT like onlay,overlay,partial crowns, inlay,Richmonds crowns,Sharonlay,Endocrowns and Post-Core.

Aquilino et al in 2002 stated that the full crown is considered the gold standard, with a six times greater rate of success in endodontically treated teeth.[14] In our study, 45.6% of practitioners preferred to provide all ceramic crowns in anterior and 64.2% full crowns in posterior teeth followed by direct restorations.Very less incidence was reported for the use of other restorative options.Where as the survey conducted in Manchester found that,the majority of the practitioner's restored root-filled teeth by means of PFM crowns.[11]Mannocci et al in 2014 suggested that the use of composites has also allowed the clinicians to restore teeth with adhesive techniques that would otherwise require extensive and destructive mechanical retentions.The use of partial crowns is becoming increasingly popular and this also helps prevent tooth structure loss.[8]

Endodontic failure is the most common cause of failure of treatment according to 44.9% of practitioners in the current study. The survey conducted by Akbar I. et al (2015) shows that crown fracture was the most common reason for the failure of ETT followed by endodontic failure.[15]

The purpose of the post placement is to retain the core foundation and not to reinforce an ETT.[16]According to current concepts, the risk of root fracture can be minimized by preservation more bulk of dentin which is lost while post space preparation.[17] Present survey shows that around 74.9%practitioners believed that post reinforces ETT, but only 40.2% practitioners followed this practice. Similarly, in Sweden, Germany and Northern Ireland surveys most of the practitioners (54%) regardless of professional experience believed that post strengthen ETT.

In the current study, 41.8% of practitioners were in agreement that the ferrule effect always can increase fracture resistance and 54.5% believes that reducing the level of the finishing line below the core foundation following post cementation increases the fracture resistance of ETT.While the studies in the United States (73%) and Germany (72%) where practitioners believe that the ferrule effect is a key factor in avoiding clinical failures of ETT.[18] According to Juloski et al in 2012, for a more predictable restoration, a properly executed ferrule must be 1.5-2mm high, especially on the palatal and buccal walls.[19]

In the present study,60.4-66.9% practitioners prefered to provide prefabricated post. 51.4% practitioners believed that cast post is better from a longevity point of view. According to previous survey conducted in Manchester(2002), the use of cast metal post was more popular mainly in anterior teeth.[9] In the current study,42.3% of practitioners responded that parallel tapered post should be preferred for retention purpose, while, 72.9% are in favour of using a fibre post for enhancing aesthetic outcome. According to Shashikala et al in 2011, accumulation of metallic corrosive products weakens dentin and the interface between post and canal. Fiber-reinforced posts preserve tooth structure and have similar elastic modulus as dentin making them more compatible than cast posts.[20]

In our study,61% practitioners preferred to provide post 2/3rd of root length and 63.6% practitioners preferred to leave 4-5mm of GP for maintaining the apical seal.The same results were obtained by a study in Germany and Saudi Arabia.[15,18]This seal is important as there is a presence of lateral canals in the apical third of roots.

Various irrigants like saline, sodium hypochlorite, EDTA and chlorhexidine are used to remove smear layer before cementation of the post. In the current study, 39% of practitioners use saline for rinsing canal before post placement while 34% practitioners prefers sodium hypochlorite followed by EDTA(17.7%).The practitioners in the study conducted by Bitter et al in 2003 use sodium hypochlorite followed by saline for rinsing the root canal.[21] Luting cements primary function is to fill the voids at post-toothinterface and mechanically lock the post in place to prevent its dislodgement.In our study, 36.9% practitioners use resin cement followed by 34% using glass ionomer cement as a luting agent while post placement,whereas zinc phosphate cement use is rare. Resin based luting cements provide internal bracing to the remaining tooth tissue.[19]This is in contrast to findings in Sweden and USA(2001) were most commonly used cement is zinc phosphate.[13] In the study conducted by Seow et el (2002), half of the practitioners used glass ionomer cement.[11]

CONCLUSION

There is a need of taking more recent conservative approaches in consideration for providing post-endodontic restorations. This is the need of the new era to know the importance of remaining dentin to enhance clinical longevity of ETT. There is a lack of knowledge regarding the importance of choice of irrigant for final rinsing of canal before post placement,choice of type of post and its luting strategies.Advanced training programmes can help the clinicians to upgrade their practicing trends regarding restoration of ETT.

Conflict of interest: Nil
Source of support: Nil

REFERENCES:

[1] Mathada S.(2014), "Sharonlay a novel postendodontic restorative design for premolars". A review J of OR,6(2),75-9.
[2] Zarow M.(2018) "New classification for RFT restoration".IEJ,51,318-34.
[3] B. Suresh Chandra & V. Gopikrishna. "Grossman's endodontic practice". 13th edition,398.
[4] Ray HA(1995),"Periapical status of endodontically treated teeth in relation to the technical quality of the root filling." IEJ,28,12-8.
[5] Belli S.(2015) "Direct Restoration of Endodontically Treated Teeth". Oral Health Rep 2,182–189.
[6] Ferrier S.(2008) "A Study of the Fracture Resistance of NyyarCores."Operative Dentistry,33(3),305-311.
[7] Whitworth J.(2002) "Crowns and extra-coronal restorations." BDJ,19(6),315-325.
[8] Mannocci(2014) - "Restoration of endodontically treated teeth,"BDJ,16(6),341-346.
[9] Torabinejad M.(1990) "In vitro bacterial penetration of coronally unsealed endodontically treated teeth." JOE,16.566-9.
[10] Saunders WP. (1994) "Coronal leakage as a cause of failure in root-canal therapy: a review."EDT,10,105-8.
[11] Seow LL(2003) "A survey of current practices among general dental practitioners in ManchesterPrim Dent Care",10,87-92.
[12] Hussey DL(1995) "A survey of general dental practitioners approach to the restoration of root-filled teeth." IEJ1995, 28,91-4.
[13] Eckerbom M.(2001) "A survey of current opinions among board-certified prosthodontists and general dental practitioners in Sweden"IJP, 14,245-9.
[14] Aquilino S.(2002) "Relationship between crown placement and the survival of endodontically treated teeth."JProsthetDent, 87,256-63.
[15] Akbar I.(2015) "Knowledge,attitude of restoring endodontically treated teeth by dentists in north of Saudi Arabia."IJOHS,9(1),42-49
[16] Schwartz RS.(2004) "Post placement and restoration of endodontically treated teeth: a literature review." J Endod,30,289-301.
[17] AssifD.(1994)"Biomechanicalconsiderations in restoring endodontically treated teeth" JPD 71,565-7.
[18] Naumann M.(2006) "Treatment concepts for the restoration of endodontically treated teeth: a nationwide survey of dentists in Germany." JPD;96,332-8.
[19]Mendoza DB.(1997) "Root reinforcement with a resinbonded preformed post."JPD, 78,10-4.
[20] Shashikala K,(2011)"Clinical and radiographical evaluation of cast metal and quartz fiber posts in endodontically restored teeth."Endodontology,3,37-46.
[21] Bitter K.(2013) "Various irrigation protocols for the final rinse to improve bond strengths of fibre posts inside the root canal." EJOS,12,349-54.