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Questionnaire survey on Restorative Preferences of Prosthodontists and Post Graduate trainees of Prosthodontics for Restoring the Endodontically Treated Teeth

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Abstract

Background: There are multiple treatment options to restore endodontically treated teeth but the best treatment option is still unclear. Many factors are to be considered; including the selection of a post, the type of coronal restoration, the amount of remaining coronal structure, and selection of luting agent and selection of post material. The different aspects of post endodontic treatment remain controversial. So, the purpose of this survey-based study was to know the preferences of the prosthodontists and post graduate trainees for restoring the endodontically treated teeth.

Material and Method: A descriptive cross-sectional web-based study was done amongst the prosthodontists (Institute faculties, trainee post graduates and private practitioners). A total of 130participants responded. A survey was conducted through web-based questionnaire composed of 12 open and multiple-choice questions. After completion of data collection, it was analysed using descriptive analysis.

Result: A total of 130 respondents participated in the survey. Among them, 73.8 % were post graduate trainees, 16.9 % private practitioners & academician and 9.2 % private practitioners. Most of the participants preferred fibre post for the different clinical situations. For cementation of the fibre post and cast metal post, they preferred dual cure resin cement and glass ionomer cement respectively. Most of the participants preferred both the techniques (Direct and indirect pattern fabrication) equally for fabrication of custom-made posts.

Conclusion: Within the limitations of this study, the data indicates that the prosthodontists preferred the fibre post over the cast metal post for the endodontically treated teeth. And majority of the participants preferred dual cure cement and glass ionomer cement as a luting agent.

Keywords: Post endodontic treatment, Restoration of endodontically treated tooth, Fibre post, Custom post, Survey.

Introduction

Endodontically treated teeth are structurally different from vital teeth; major changes include altered tissue physical characteristics, loss of tooth structure, and possibly also discoloration usually a considerable amount of tooth structure has been lost because of caries, endodontic treatment, and the placement of previous restorations.[1] The loss of tooth structure makes retention of subsequent restorations more problematic and increases the likelihood of fracture during functional loading.[2] The amount of coronal tooth structure that remains is most important factor in the decision for the kind of reconstruction to be made as it affects the retention of the restoration and the fracture susceptibility of the tooth. When the remaining tooth structure does not provide enough retention for a core build-up, the root canal can provide enhanced retention by the use of a post. Thus, in a single rooted tooth with substantial loss of coronal tooth structure, a post and core are often needed.[2]

To restore endodontically treated teeth, dentists must select from different materials and techniques varying from conventional cast metal posts, prefabricated metal, carbon, and glass fiber posts or milled computer-aided design and computer-aided manufacturing (CAD-CAM) glass fibre, metal, or ceramic posts.[3]

Associating practice, knowledge, and scientific interpretation has been considered the best method and can be implemented directly and rapidly in clinical practice. Nevertheless, factors related to prosthodontists and post graduate students can also influence the decision-making process, specifically concerning clinical experience and postgraduate training.[4] Thus, the preferences of prosthodontists and post graduate students should be taken into consideration, and the treatment options should be evaluated in the clinical situation to provide reliable scientific evidence.[5,6]

Surveys are important tools for assessing and understanding the treatment approaches and decision-making process for any treatment & its execution. Therefore, the purpose of this survey was to assess the preferences of the restorative options of endodontically treated teeth among the prosthodontists and post graduate trainees.

Materials and Methodology

Study Setting

This descriptive cross-sectional study was done among prosthodontists and post graduate trainees.

Methodology

A survey was conducted through web based online standard questionnaire with 12 open as well as multiple choice questions. Questionnaire was prepared in English

language. The questionnaire comprised questions for restorative preferences for endodontically treated teeth. The questionnaire was sent to participants via social media in form of google form link. Inclusion criteria for the study was that participants must be from field of Prosthodontics. The following demographic data were collected including email address and the designation of the participants (Private practitioner, Academician, Private practitioner &Academician and Post graduate trainee).

A total of 12 questions were asked to the participants and multiple choices were given to participants. The questions were as follows: (Table 1)

Table 1

S. No.	Question / Multiple options
1	Preference of choice of post in anterior tooth restoration? A) Prefabricated metal post B) Amalgam post C) Prefabricated fibre post D) Custom made fibre post
2	Preference of choice of post in posterior tooth restoration? A) Prefabricated metal post B) Custom made cast post C) Prefabricated fibre post D) Custom made fibre post
3	Larger caries involving more than 1⁄2 of the residual tooth structure remaining, what should the initial treatment plan for anterior tooth? A) Fibre post and core followed by full crown B) Metal post and core followed by full crown C) Composite post and core followed by full crown D) Direct composite restoration
4	Larger caries involving more than 1⁄2 of the residual tooth structure remaining, what should the initial treatment plan for posterior tooth? A) Fibre post and core followed by full crown B) Metal post and core followed by full crown C) Composite post and core followed by full crown D) Direct composite restoration
5	The preferable height and width of the ferrule? A) 1 mm B) 2 mm C) 3 mm D) 4 mm
6	Preference of post for short rooted height posterior tooth? A) Single post C) Amalgam post

	B) Multiple post	D) Any of the above
7	Preference of luting agent for cementation of fibre post? A) Resin cement B) Dual core resin cement	 C) Glass ionomer cement D) Any other
8	Preference of luting agent for cementation of cast metal post? A) Resin cement B) Zinc phosphate cement	 C) Glass ionomer cement D) Any other
9	What should be the minimum length of the post? A) Post should be longer than the crown B) Post should be 2/3rd of the root length	 C) Length should equal to the crown height D) All of the above
10	How much post is normally extending from the coronal structure how much length of post should extrude out from canal orifice into core? A) Full length of prepared tooth B) Half of the length of prepared tooth	 C) 3/4th the length of prepared tooth D) 2/3rd the length of prepared tooth
11	Preference of impression making for custom made cast post? A) Direct pattern fabrication B) Indirect pattern fabrication	 C) Direct impression with elastomeric material D) All of the above
12	What is your preference for removal of the post? A) Ultrasonic B) Masseran technique C) Eggler post remover	 D) Post Removal System (PRS) E) Any other

Results

A total number of 130 participants responded to the web-based questionnaire survey. There were 73.8% post graduate students, 9.2% private practitioner and 16.9% private practitioner & academician. (Figure 1)

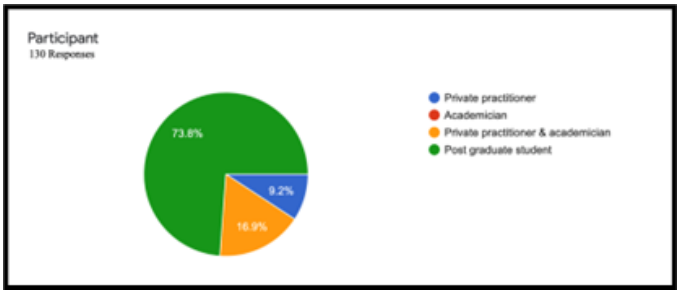

Figure 1

The preference of choice of post in anterior teeth restoration, 61.5 % participants were selected prefabricated fibre post and 36.9 % participants were selected custom made fibre post. (Figure 2)

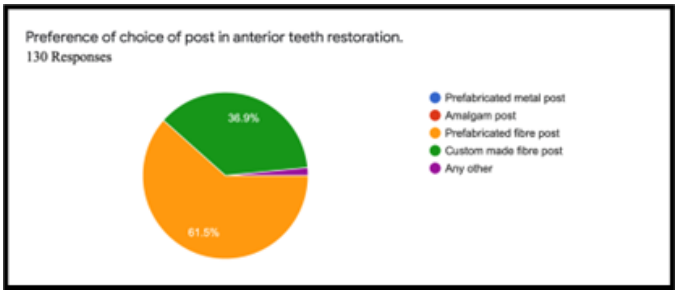

Figure 2

Regarding post preference in posterior teeth, 26.2 % participants selected prefabricated fibre post, 33.8 % selected custom-made cast post, 24.6 % participants selected prefabricated fibre post and 13.8 % participants selected custom made fibre post. (Figure 3)

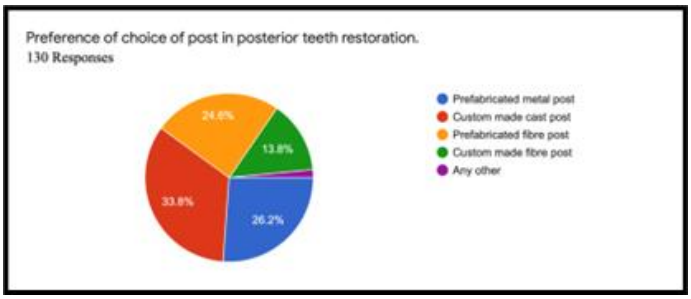

Figure 3

66.2 % participants selected fibre post and core followed by full crown, 12.3 % participants preferred composite post and core followed by full crown, 10.8 % participants were in favour of direct composite restoration for larger carious lesions involving more than ½ of the residual tooth structure remaining for anterior tooth. (Figure 4)

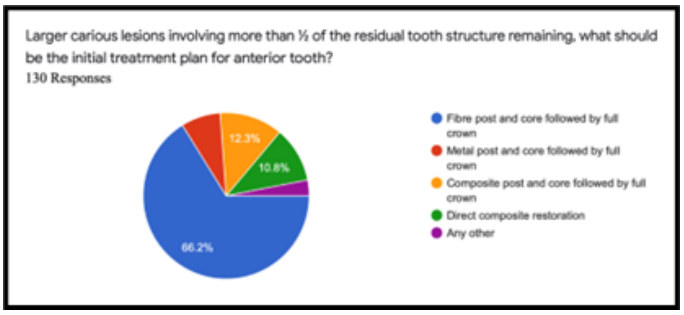

Figure 4

While the 47.7 % participants selected cast metal post and core followed by full crown, 38.5 % participants selected fibre post and core followed by full crown for larger carious lesion involving more than ½ of the residual tooth structure remaining for posterior tooth. (Figure 5)

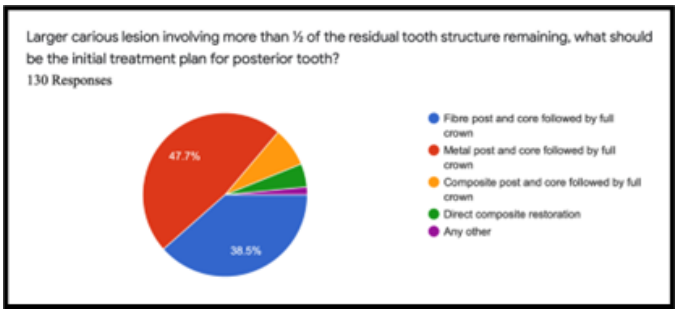

Figure 5

The preferable height and width of the ferrule, was 2mm according to 78.5% participants and 1 mm in accordance with 13.5% participants. (Figure 6)

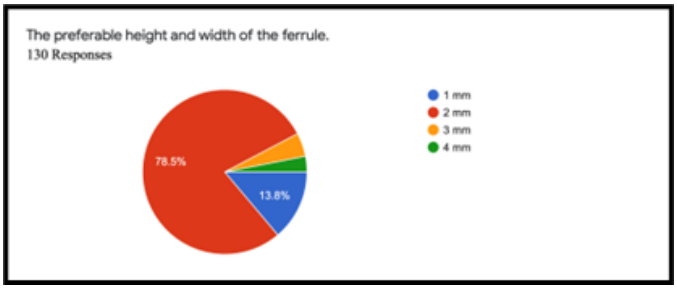

Figure 6

50.8 % participants preferred multiple post for short height molar teeth while 40 % participants were fine with single post. (Figure 7)

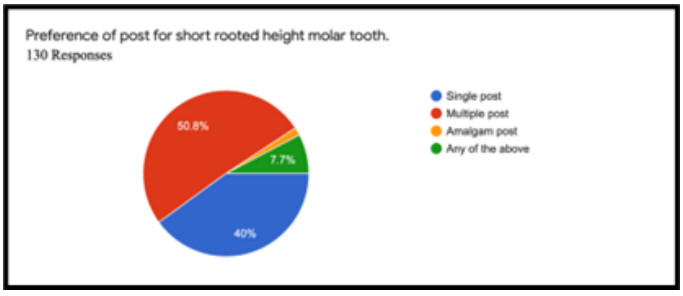

Figure 7

Dual cure resin cement was used commonly by 67.7% participants as preferred luting agent for cementation of fibre posts while only 20 % participants selected light cure resin cement & 10.8% selected glass ionomer cement. (Figure 8)

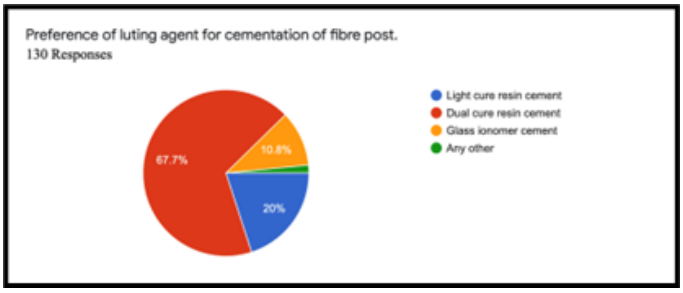

Figure 8

While cast metal post cementation was preferred with GIC by 63.1% participants. 20 % participants preferred light cure resin cement and 12.3 % participants selected zinc phosphate cement for preferred the same. (Figure 9)

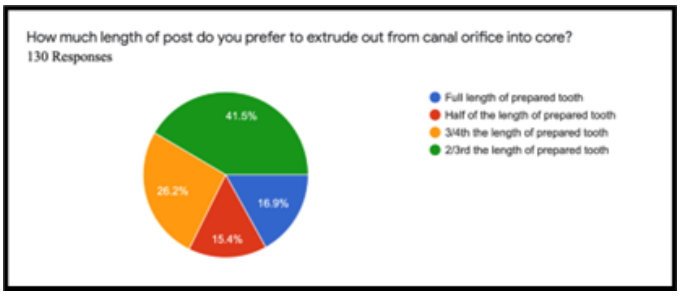

Figure 9

Most participants (73.8%) preferred post to be 2/3rd of the root length. 10.8 % participants said that its length should be equal to crown length and 10.8 % participants select post length based on adequate apical seal for the adequate length of the post. (Figure 10)

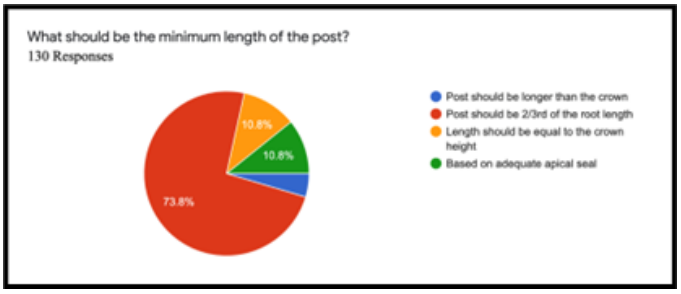

Figure 10

Among 130 participants, 41.5 % participants keep post extrude from orifice about 2/3rd of length of the prepared tooth, 26.2 % participants preferred it 3/4th of the length of the prepared tooth, 16.9 % participants keep it till full length of prepared tooth while 15.4 % participants prefer to extrude it only half of the length of the prepared tooth from canal orifice into core. (Figure 11)

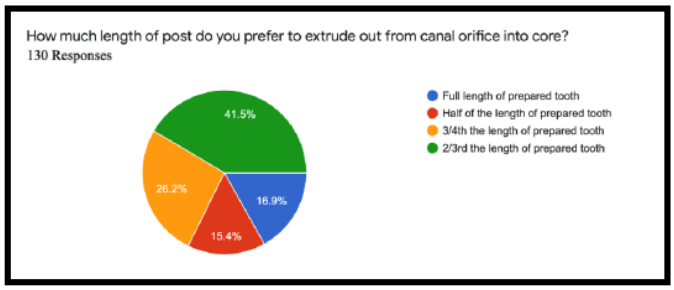

Figure 11

The impression making for custom made cast post was done by direct pattern fabrication (33.8% participants) followed by indirect pattern fabrication (27.7% participants). 38.5 % participants selected the combination of both. (Figure 12)

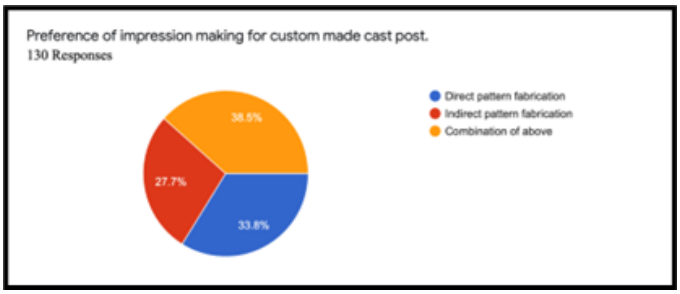

Figure 12

43.1 % participants preferred post removal system (PRS system), 26.2 % participants selected ultrasonic, 13.8 % participants use Masseran technique and 12.3 % participants use some other method for removal of the post. (Figure 13)

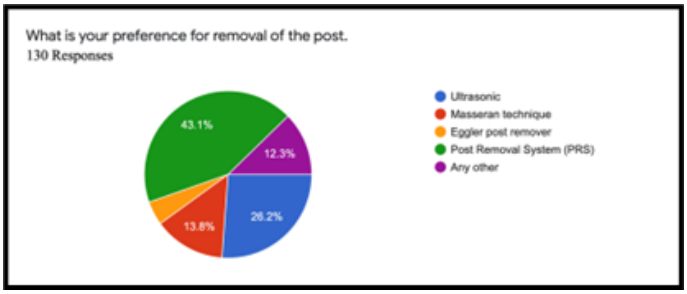

Figure 13

Discussion

The findings of this study can provide information about preferences of participants for the restoration of

endodontically treated teeth. The data show that dentists preferred prefabricated and cast metal posts to restore endodontically treated teeth and resin-based luting agents for bonding such posts. Xue *et al.* in 2020 in their study on the effect of glass fiber post and metal post in restoration of anterior tooth defect and conclude that fibre and metal post both have the satisfactory results.[7] Marielle Dias Martins et al. stated that the no difference was observed between the fibre post and metal post when evaluated the anterior or posterior region rehabilitation was considered.[8]

The benefits of using these fibre glass posts include improved biocompatibility, faster processing, aesthetics, modulus closer to dentin and corrosion resistance. In addition, fibre glass posts have been reported to reduce the likelihood of irreparable root fractures compared to traditional cast metal posts.[9] Accumulation of metal corrosion by-products also weakens the dentin and the interface between the dentin and the prepared canal. The new fibre reinforced post system is thus more compatible and easier to remove in post failures than metal post systems.[10]

In this study, most of the participants selected 2 mm height and width of the ferrule. The findings of the present study are supported by Jelena Juloski et al. They concluded that the presence of a 1.5- to 2-mm ferrule has a positive effect on fracture resistance of endodontically treated teeth.[11]

For the short-rooted height molar, multiple post are required as the most participants selected. Rashmi Bansal concluded that two short posts are sufficient to provide retention and anti-rotational feature instead of one long post.[12]

The dual cure resin cement, resin cement and glass ionomer cement commonly used as a luting agent for fibre post; ideally dual cure cement should be used for cementation of the fibre post. Other than that the surface conditioning of the post had a better results.[13] The participants preferred the glass ionomer cement and resin cement as a luting agent for cast metal post. Luiz *et al.* concluded that cast post and core cemented with the zinc phosphate and resin cement demonstrated similar retentive values.[14] Morgana Vicentin et al. concluded that resin cement presented the higher tensile bond strength compared to glass ionomer cement and zinc phosphate cement for metal post.[15]

It is desirable that the post descends at least two-thirds of the length of root canal (or not less than the height of the crown) in order to provide sufficient retention.[16] Similar findings were observed by Necd et et al. who concluded that post length should not be shorter than clinical crown length when glass fiber posts are used and post lengths equal to clinical crown length yielded adequate fracture resistance.[17]

Direct and indirect impression techniques of post space results in cast posts that are shorter than the impressed post space. The discrepancy is greatest for the indirect technique. Nevertheless, all posts are considered clinically acceptable and were cemented as in study by Aline Pinheiro et al..[18]

Nowadays, Post Removal Systems Are Using for Removal of The Post. Most Of the Participants In This Study Prefer Post Removal System And Ultrasonic. Luiz O Purger Et Al. Did A Systematic Review For Removing Fibre Endodontic Post And Stated That There Is No Consensus In The Literature As To Which Technique Is The Best For Removing Fiber Posts Luted With Resin Cements Of Endodontically Treated Teeth. However, The Results Tend To Show Greater Agility In Removing Fibre Posts With Manufactured Removal Kits And The Ultrasonic Inserts Seem To Work Better In Removing The Remains Of Fibre And Luting Agent.[19]

Conclusion

Within the limitation of the study, majority of the participants prefer the fibre post over the cast metal post; and luting of post with either dual cure cement or glass ionomer cement. For anterior teeth restoration, most of the participants chose fibre post. both the techniques (direct and indirect pattern fabrication) are preferred almost equally for fabrication of custom-made posts.

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