Knowledge and Practice of Restoring Endodontically Treated Teeth by Dentists in Panevezys

Laura Jacinkeviciute, Dovile Gabseviciute, Gediminas Skirbutis
Lithuanian University of Health Sciences, Medical Academy, Faculty of Odontology, Department of Prosthodontics
Corresponding Author: Laura Jacinkeviciute
ljacinkeviciute@gmail.com

ABSTRACT

Background: The most important purpose for dentists is restoring normal occlusion and function of the teeth after endodontic treatment. This is a difficult aim for dentists because it depends on the choice of post and core build-up material. Objective: This study was designed to investigate the present opinions and knowledge of Panevezys dentists about current strategies and materials to restore endodontically treated teeth. Methods: The cross-sectional study used an original sample of 136 randomly selected Panevezys dentists. The semi-self administered questionnaire consisted of two parts: a demographic part and knowledge test. The questionnaires were distributed and collected between November 2016 and January 2017. Results: The results demonstrate statistically significant dependency on the use of metal posts by dentists who have practiced for more than 10 years compared with those who have practiced for less time (P<0.05). Younger dentists use glass-fiber posts more often, but there was no statistically significant difference (P=0.22). Respondents who work at state institutions do not prefer to use glass-fiber posts (P<0.05). The results show a statistically significant difference that prosthodontists are usually preferred to restore teeth with metal posts compared with endodontists and general practitioners (P<0.05). Root fracture is the most common complication when teeth are restored using metal post, which was statistically significant (P<0.05). Conclusion: Methods and materials of restoring endodontically treated teeth depend on the group of teeth and defect size. The respondents decide to place an intracanal post when only two coronal walls or less are left.

Keywords: Post-endodontic restoration; Survey; Dentists

1. INTRODUCTION

The most important purpose for dentists is restoring normal occlusion and function of the teeth after endodontic treatment. After root canal treatment, teeth are structurally damaged, a large amount of tooth structure is lost, and teeth are much more weaker. Previous studies have shown that the strength of the endodontically treated teeth depends not only on the remaining dentin, and also on the periapical status and position of the tooth, the number of adjacent teeth, and occlusal contacts. However, the prognosis of an endodontically treated tooth depends on endodontic procedures, and it is influenced by post-endodontic restoration. This is a difficult aim for dentists because it depends on several other factors: tooth type, the choice of post and core build-up material, the length of the post, the luting agent, and the ferrule. Glass fiber posts are currently the most popular restoration material for post and core. Compared with metal posts, glass fiber posts have more advantages, such as better esthetics and strength, and they also have a similar modulus of elasticity and rigidity compared with dentin. Glass fiber posts have a lower risk of root fracture than metal posts. For glass fiber posts, dental impressions and dental technicians are not needed. Instead of two visits, only one appointment is needed for patients receiving glass fiber posts. Despite all the advantages of glass fiber posts, a large
amount of tooth coronal structure is restored with composite, and it is difficult to restore curved canals using these posts materials\(^9\).
The purpose of the post placement is to reinforce endodontically treated teeth. Studies have shown that the post should be used when there is no enough tooth structure to brace the core restoration\(^10\). However, for the private practitioner, it is difficult to decide on the post-endodontic restoration material and speed with all the latest scientific news about posts\(^11\).

Dentists are restoring endodontically treated teeth based on their own practice experience. Surveys are an important tool for showing dentists’ understanding of treatment attitudes and of their knowledge about endodontically treated teeth, which is gained by sharing experience between practitioners\(^12\).

Although restoration of endodontically treated teeth is important, there is no information about the Lithuanian dental practices on this topic. No clear information is published about Lithuanian practitioners’ proper treatment protocol. This study was designed to investigate the present opinions and knowledge of Panevezys dentists on current strategies and materials to restore endodontically treated teeth.

2. METHODS

To collect data, a questionnaire in Lithuania, Panevezys city was constructed, between November 2016 and January 2017. For this study, ethical approval was approved by the Lithuanian University of Health Sciences Bioethics Committee (approval number BEC-CF-47). The sample size was determined by the formula of Paniotto\(^13\).

\[
n = \frac{1}{(\Delta^2 + \frac{1}{N})} = \frac{1}{(0.05)^2 + \frac{1}{204})} = 135
\]

Where:

- \(n\) – the sample size
- \(\Delta\) - error
- \(N\) – the population size

The questionnaire was distributed by hand and through email to randomly selected state polyclinics and private practice dental offices. An original sample of 170 (out of 204 active in Panevezys) dentists was randomly selected. The confidentiality of the responses was secured.

The questionnaire consisted of two parts: demographic information and the second part—multiple choice type questions. The demographic part of the questionnaire consisted of 5 questions about dentist’s general personal information: sex, university of graduation, specialization, professional work experience, and workplace. The second part of the questionnaire was formed with 9 questions, which revealed dentists treatment methods: type of post, the frequency of post, luting cement, complications. The dentist was permitted to choose more than one answer in the second part.

All data collected were entered in a Microsoft Excel table. Statistical analysis was performed with SPSS 22.0 software package. A P value of 0.05 or less was considered as statistically significant for hypotheses. Kolmogorov-Smirnov test was used to check variable distribution normality.

Nonparametric Mann-Whitney or Student t-test were used for comparison of two groups. For more than two groups- nonparametric and parametric analysis of variance (ANOVA and Kruskal-Wallis test). The connection between the signs has been applied to determine the Spearman correlation coefficient.

3. RESULTS

One hundred and thirty-six dentists completed the survey; the response rate was 80%, and 83.8% of the participants were females. Most participants (89.7%) were graduated from the Lithuanian University of Health Sciences, and the rest graduated from Vilnius University (10.3%). Most respondents were general practitioners (81.6%), 15.4% were prosthodontists and 2.9% endodontists. The mean time in service as a practicing dentist was 10.18 years, and 55.9% of the participants worked in private institutions, 19.1% worked in state clinics, and 25% had worked in both (Table 1).

<table>
<thead>
<tr>
<th>Table 1. Demographic information.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic information</strong></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Graduated University</strong></td>
</tr>
<tr>
<td>Lithuanian University of Health Sciences</td>
</tr>
<tr>
<td>Vilnius University</td>
</tr>
<tr>
<td><strong>Specialization</strong></td>
</tr>
<tr>
<td>General dental practitioners</td>
</tr>
<tr>
<td>Prosthodontists</td>
</tr>
<tr>
<td>Endodontists</td>
</tr>
<tr>
<td><strong>Mean of work experience</strong></td>
</tr>
<tr>
<td>Practice</td>
</tr>
<tr>
<td>Private institutions</td>
</tr>
<tr>
<td>State clinic</td>
</tr>
<tr>
<td>Both</td>
</tr>
</tbody>
</table>

When asked, “How often do you prefer posts for anterior teeth after root canal treatment?” the majority responded “often,” for premolars 48.5% said “very rarely” and 36.8% “often” and for molars, 51.5% of the participants asked “often” (Table 2).

Table 2. Percentage of respondents using posts for all teeth groups after root canal treatment.

<table>
<thead>
<tr>
<th></th>
<th>Anterior teeth</th>
<th>Premolars</th>
<th>Molars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very often</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Often</td>
<td>27.9</td>
<td>36.8</td>
<td>51.5</td>
</tr>
<tr>
<td>Sometimes</td>
<td>44.9</td>
<td>12.5</td>
<td>15.4</td>
</tr>
<tr>
<td>Very rarely</td>
<td>25.0</td>
<td>48.5</td>
<td>27.9</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

For all tooth groups (anterior teeth, premolars, and molars), most dentists decided to place an intracanal post when two coronal walls or less remained (56.6%, 54.4%, and 54.4% respectively).

After root canal treatment for anterior teeth, the participants usually used glass fiber posts (33.1%), and they never used metal screws. Additionally, 39% of the participants restored an endodontically treated posterior tooth using glass-fiber post, and 30.1% used a metal post.

Among the respondents, 77.2% said they leave 4mm of filling material in the root canal.

Natrium hypochlorite is the most commonly used rinse for a root canal before luting the post (76.5%). The majority of the participants prefer using glass ionomer cement for metal posts (86%) and glass ionomer cement (52.2%) or resin cement (46.3%) for glass fiber posts.

When asked about complications after luting the post, 34.6% of respondents said “root fracture,” 25% responded “root canal treatment mistakes,” and 7.4% indicated “coronal fractures.”

The results demonstrated a statistically significant dependency on the use of metal posts by dentists who have practiced for more than 10 years, compared with those who have practiced for less time (P<0.05); younger dentists use glass-fiber posts more often. There was no statistically significant difference comparing these two groups (P=0.22). Respondents who work at state institutions do not prefer to use glass fiber posts compared to those who work in private institutions (P<0.05). Prosthodontics are usually preferred to restore teeth with metal posts compared with endodontists and general practitioners (P<0.05).

Root fracture is the most common complication when teeth are restored using a metal post, which was statistically significant (P<0.05).

4. DISCUSSION

This study was designed to investigate current opinions and knowledge of Panevezys dentists about current strategies and materials to restore endodontically treated teeth. Half of the dentists answered that they restore teeth after endodontic treatment with a post, which indicates that this topic is clinically highly relevant. The questionnaire results show that the choice to place a post depends on the remaining coronal walls and tooth type. More than a half of respondents leave 4mm of filling material apically. Among the most popular post types, glass fiber posts dominated, although metal posts were frequently used for posterior teeth.

This was the first study to show the opinions of Panevezys dentists’ opinion about posts after endodontic treatment. Because of the random sampling procedure and the high response rate, this study results can be representative of all Panevezys city dental practitioners. The response rate of the participants was high (80%), which was better than in other studies that have been published before on similar topics[14,15]. However, this study evaluated a small sample size compared to other surveys[16].

Slightly less than a half of participants (48.5%) said they often use the post for anterior teeth, premolars (48.5%), and posterior teeth (51.5%). This means that about half of Panevezys dentists restore 75% of their endodontically treated teeth using posts. These results are comparable to those presented by Naumann et al. from Germany[14]. About 54% of Germany dentists think that after endodontic treatment, the tooth must be restored using a post. Similar results were found among dentists in Northern Ireland (43%) and the United States (59%), who accept the concept that the post system reinforces the tooth after endodontic treatment[17,18]. These results are in opposition to the results reported by Kon et al.[19]. In contrast to previous studies, Kon et al. showed that only 17.9% of dentists in Switzerland often use posts when restoring endodontically treated anterior teeth, and this percentage was 18.9% for premolars, and 23.2% for molars.

For many years, metal posts were used to restore endodontically treated teeth, but then glass-fiber posts started to be used clinically, resulting in controversy.
and intensive discussions. In this study, it was common among dentists after an anterior tooth root canal treatment to use glass fiber posts but not metal posts (33.1%), while 39% of the participants restore posterior teeth using glass fiber post, and 30.1% use a metal post. Among Panevezys dentists, cast posts were used with the same frequency as prefabricated posts. British and Swedish dentists preferred metal posts, while in UK and Germany prefabricated posts were used more commonly.[12,14,20,21]

In the present study, statistically significant results showed that prosthodontists more often prefer to restore teeth with metal posts compared with endodontists and general practitioners. Similar results were obtained among Saudi Arabia dentists. Akbar et al.[22] showed that prosthodontists use metal post (11.7%) more often than fiber post (5.2%), which is opposite for general practitioners, who use fiber posts (35.9%) more often than metal posts (31.3%). Kavelker et al. [23] reported that both, prosthodontists and general practitioners use fiber post more often than metal posts. A possible explanation may be because prefabricated posts are easy to use, do not require a dental technician, and require less chair-side time.

It is recommended to rinse the canal before post cementation to remove the smear layer after root canal instrumentation[23]. In the current study, respondents use various irrigants such as saline, sodium hypochlorite, EDTA, and distilled water to remove all debris before cementing the post. More than a half of Panevezys dentists use natrium hypochlorite (76.5%). Recent studies show that 5.25% NaOCl had no effect on the bond strength between fiber posts and root canal walls. However, the use of 37% of phosphoric acid for 60 s increased the bond strength in the apical third of the root dentin[24].

Most dentists reported root fracture and endodontic treatment failure as the most frequent cause of failure. In this study, 34.6% of Panevezys dentists stated that root fracture is the most common mistake after post luting and 25% said it is root canal treatment mistakes. In Germany, loss of retention (43%) was the most common mistake followed by endodontic treatment failures (36%) and root fractures (29%) [14]. Saudi Arabian dentists reported similar mistakes. Crown fracture (45%) is the most common reason for failure, followed by endodontic failure (31%) and root fracture (18%) [22].

5. CONCLUSION

The following conclusions can be drawn from this study:

1. Methods and materials of restoring endodontically treated teeth depend on the group of teeth and defect size.
2. The respondents decide to place an intracanal post when only two coronal walls or less are left.
3. Dentists in Panevezys use natrium hypochlorite to rinse the root canal, and they usually prefer glass ionomer and resin cement.
4. The most common complications after luting the post are fractures of the root and root canal treatment mistakes.

REFERENCES
