

PREFERENCE OF ROOT CANAL SEALERS AMONG PEDIATRIC DENTISTS - A CROSS - SECTIONAL STUDY

Pedodontics

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ABSTRACT

Introduction: Utilisation of root canal sealers to perform obturation procedures is an endorsed method in endodontics and has an indispensable role in the success of treatment. Hence the aim of the study is to explore the preferences of root canal sealers among pediatric dentists. **Materials and method:** The data of patients reporting to Saveetha Dental College and Hospitals was reviewed and patients below 18 years of age with endodontically treated teeth were selected for the study. It included parameters like age, gender, endodontically treated teeth type, and type of sealer used. Chi square tests were carried out using endodontically treated teeth number as independent variable and type of root canal sealer used as dependent variable. The statistical analysis was done by Pearson chi square test. P value < 0.05 was considered statistically significant. **Results:** Majority (93.8%) of patients were between the age group of 10-18 years, and males (53.5%) had a slight predominance over females (43.5%). Resin based sealers were the most preferred type of sealer used for all the teeth types for endodontic treatment. The Chi square value was found to be statistically significant (0.018). **Conclusion:** Resin based sealers were preferred more by pediatric dentists for root canal treatment over zinc oxide based sealers.

KEYWORDS

Dental Caries; Endodontics; Gutta Percha; Obturation; Novel Technique; Sealers.

INTRODUCTION:

Dental caries is the most common infectious disease of childhood and adolescence and is rated the highest among dental problems.(1) Caries prevalence has increased in the last four decades.(2) If the cariogenic environment persists in the oral cavity, the newly erupted permanent teeth may get decayed.(3) Young permanent teeth have wide dentinal tubules, a large pulp chamber, and high pulp horns, shortening the distance for decay to reach the pulp.(4) If not treated early, infection of the dental pulp will eventually occur.(5)

Tooth preservation is the ultimate goal of modern dental care and root canal therapy (RCT) is an available, efficacious therapeutic strategy to retain teeth. Root canal treatment also known as endodontic treatment is one of the most technically demanding procedures and a very specialized aspect in restorative dentistry requiring a high level of technical skills.(6)

Root canal treatment incorporates a sequence of steps with the objective of treating the infected root canal of a tooth, thus resulting in the resolution of the infectious process and in the counteraction of microbial invasion in the affected tooth.(7)

The purpose of endodontic treatment is to eradicate the infection of the root canal and to meticulously restore the root canal space in three-dimensions, in order to counteract the apical and coronal penetration of liquids and microorganisms which could cause re-infection.(8,9) Relatively root canals of permanent teeth are filled with gutta percha points in consolidation with a root canal sealer which are crucial elements of root canal obturation to establish a fluid-tight seal that provides a biological environment for healing of periapical tissue.(10) The principal function of an endodontic sealer is to function as a lubricating agent that fills the space between the core material and the walls of the root canal and between the gutta-percha points, in an endeavor to form an explicit mass of root filling material without voids.(11,12)

An endodontic sealer with the property of strengthening the tooth against root fracture would be of indisputable value, as the root canal therapy is reinforced by obturation, which increases the resistance of the tooth to compressive strength.(13,14) Therefore, the bonding action of sealer to the dentine is predominant in preserving the stability of the seal in a root canal obturation.(15)

Numerous types of root canal sealers are being used in dentistry, such as the resin-based AH Plus, calcium hydroxide-based Apexit plus, Zinc oxide- based Tubliseal, Glass Ionomer-based Ketac endo, Mineral Trioxide Aggregate-based sealers, bioceramic sealers, methacrylate-based resin sealers, and calcium phosphate sealers.(16,17)

Treatment of pulpal infection in permanent teeth in children and young adults presents a unique challenge to dental clinicians.(18)

Utilisation of root canal sealers to perform obturation procedures is an endorsed method in endodontics and has an indispensable role in the success of treatment. Our team has extensive knowledge and research experience that has translate into high quality publications(19–31) (32–38) Hence the aim of the study is to explore the preferences of root canal sealers among pediatric dentists.

MATERIALS AND METHOD:

Study Design And Study Setting:

The present study was conducted in a university setting (Saveetha dental college and hospitals, Chennai, India). Thus the data available is of patients from the same geographic location and have similar ethnicity. The retrospective study was carried out with the help of digital case records of 975 patients who reported to the hospital. Ethical clearance to conduct this study was obtained from the Scientific Review Board of the hospital.

Sampling:

Data of 975 patients were reviewed and then extracted. All patients below 18 years of age with endodontically treated teeth in the given duration of time period were evaluated. Only relevant data was included to minimize sampling bias. Simple random sampling method was carried out. Cross verification of data for error was done by the presence of additional reviewers and by photographic evaluation. Incomplete data collection was excluded from the study.

Data Collection:

A single calibrated examiner evaluated the digital case records of patients who reported to Saveetha Dental College from June 2019 to June 2021. For the present study, inclusion criteria was data of patients with endodontically treated anterior teeth. Data obtained were age, gender, endodontically treated teeth number, and type of root canal sealer used. All obtained data were tabulated into Microsoft excel documents.

Statistical Analysis:

The collected data was tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 (SPSS Inc., Vancouver style) and results were obtained. Categorical variables were expressed in frequency and percentage. Chi square test was used to test association between categorical variables. Chi square tests were carried out using endodontically treated teeth number as independent variable and type of root canal sealer used as dependent variable. The statistical analysis was done by Pearson chi square test. P value < 0.05 was considered statistically significant.

RESULTS:

Majority (93.8%) of the patients below 18 years undergoing endodontic treatment were from the age group of 10-18 years of age. (Figure1)

Males had a slight predominance (53.5%) undergoing endodontic treatment over females (46.5%). (Figure2)

Mandibular posterior teeth (46.6%) were the most common teeth to undergo root canal treatment in patients below 18 years, followed by maxillary anteriors (29.2%). (Figure3)

Resin based sealers (69.2%) were the most preferred type of sealer used among pediatric dentists. (Figure4)

On associating the type of sealer used with the teeth number, resin based sealers were the most preferred type of sealer used for all the teeth type for endodontic treatment. The Chi square value was found to be statistically significant (0.018). (Figure5)



Figure 1: This graph represents the distribution of patients based on age. X-axis denotes the age groups and Y-axis denotes the percentage of patients.

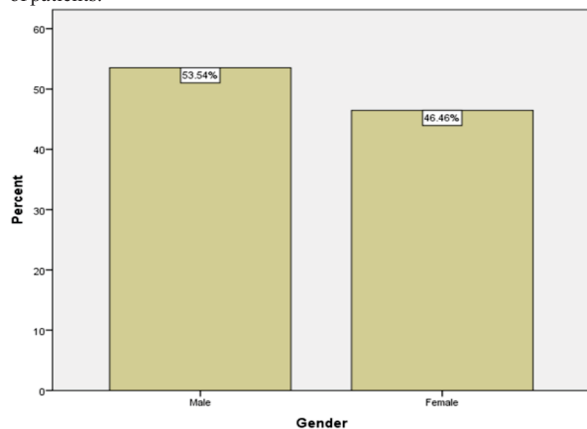


Figure2: This graph represents the distribution of patients based on gender. X-axis denotes the gender and Y-axis denotes the percentage of patients.

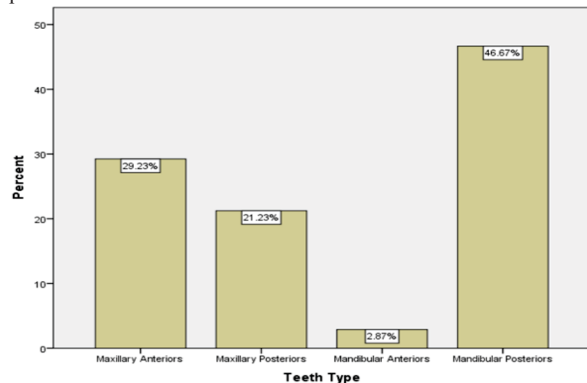


Figure3: This graph represents the distribution of patients based on

endodontically treated teeth. X-axis denotes the teeth number and Y-axis denotes the percentage of patients.

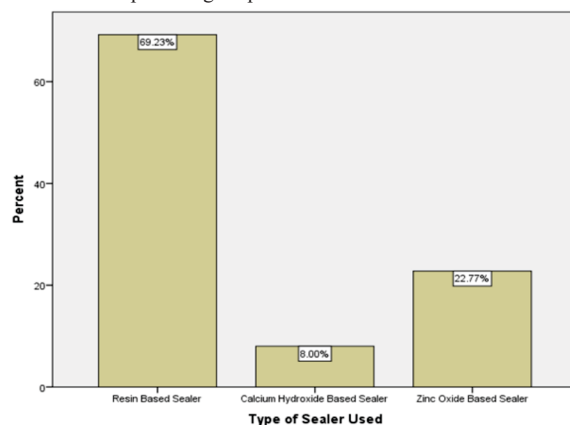


Figure4: This graph represents the distribution of patients based on the type of sealer used. X-axis denotes the types of sealer and Y-axis denotes the percentage of patients.

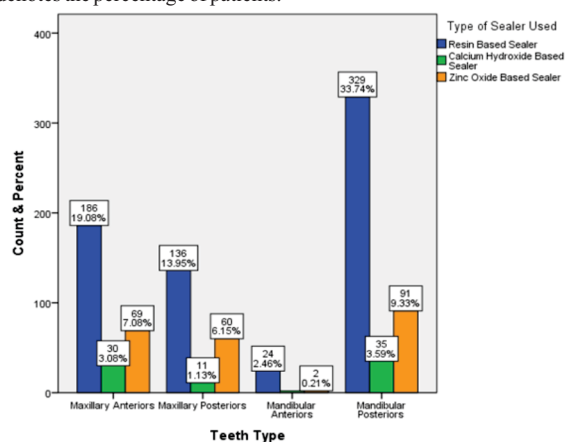


Figure4: This graph represents the association of type of sealer used with endodontically treated teeth. X-axis denotes the different types of teeth and Y-axis denotes the number of patients undergoing root canal treatment. Blue colour denotes “ Resin based sealer”, green colour denotes “ Calcium Hydroxide based sealer”, and orange colour denotes “ Zinc Oxide based sealer”. Resin based sealers were the most preferred type of sealer used for all the teeth types for endodontic treatment. The Chi square value was found to be statistically significant (0.018).

DISCUSSION:

Dental caries is the most common infectious disease of childhood and adolescence and is rated the highest among dental problems. (1) Caries prevalence has increased in the last four decades. (2) If the cariogenic environment persists in the oral cavity, the newly erupted permanent teeth may get decayed. (3) Young permanent teeth have wide dentinal tubules, a large pulp chamber, and high pulp horns, shortening the distance for decay to reach the pulp. (4) If not treated early, infection of the dental pulp will eventually occur. (5)

Tooth preservation is the ultimate goal of modern dental care and root canal therapy (RCT) is an available, efficacious therapeutic strategy to retain teeth.

A slightly higher number of males had pulpal involvement in young permanent teeth (53.5%) compared to females (46.5%). These findings are in contrast with Ebtissam M et al, who reported a significantly higher number of females (74%) had pulpal involvement in young permanent teeth. The discrepancy can be because of the fact that tooth eruption occurs earlier in girls than boys; therefore, caries exposure and subsequently pulpal involvement could occur earlier [24]. Females have also been reported to visit the dentist more frequently than males [25]. Females might also be more able to vocalize their complaints about their teeth to their parents [7].

In our study, majority (93.8%) of the endodontic treatments were done

in patients above 10 years of age. These findings were similar to Ebtissam M et al.(6) who also reported that the number of young permanent teeth with pulpal involvement and their treatment significantly increased as age increased. The largest age group with posterior teeth with pulpal involvement was the 16–18-year-old group. Root canals of permanent teeth are filled with gutta percha points in consolidation with a root canal sealer which are crucial elements of root canal obturation to establish a fluid-tight seal that provides a biological environment for healing of periapical tissue. (10) The principal function of an endodontic sealer is to function as a lubricating agent that fills the space between the core material and the walls of the root canal and between the gutta-percha points, in an endeavor to form a explicit mass of root filling material without voids.(11,12)

The most common teeth to undergo root canal treatment in patients below 18 years were mandibular posteriors (46.6%). Similar findings were reported by Ebtissam M et al.(6) who reported mandibular molars (43.9%) were the most common teeth to undergo root canal treatment. Mandibular first molar has been quoted as the most caries-prone tooth in permanent dentition, probably due to its early exposure to the oral environment and its morphological features being pitted and fissured, inducing plaque and caries formation.

Root canal treatment engages an intensive chemo-mechanical preparation, followed by three-dimensional root canal filling. According to Ingle, about 58% of the endodontic failures may be ascribed to deficient obturation of the root canals (39). Gutta-percha as such has no adhesive property to dentin, nevertheless the obturation techniques employed. Thus, various researchers have tested many different materials to obliterate this space since the early 1800's.(40) Currently, the root canals are obturated with a core material in combination with an endodontic sealer.

An array of endodontic sealers are accessible commercially and they are grouped based on their chemical composition. According to the present study, resin sealers, zinc oxide eugenol sealers and calcium hydroxide sealers are more commonly used by pediatric dentists.

The different root sealers that were utilized by pediatric dentists were resin sealers (69.2%), zinc oxide sealers (22.8%) and calcium hydroxide sealers (8%). Statistically significant difference was noted in comparison ($P=0.018$). The distribution of different root sealers in relation to the type of teeth are depicted in (Figure 5).

Resin sealers have characteristics such as easy handling, potential for better wettability of the dentine and Gutta-percha surfaces, and exceptional sealing ability.(41) Resin sealers are considered as the material of choice because of their capacity to infiltrate into dentinal tubules and the chance of creating monoblocks amid the obturating material and intraradicular dentin. (42) These properties are viewed as significant among endodontic sealers.

The major shortcoming of the current study was that the reasons for utilizing specific material by pediatric dentists were not assessed. In future, long term studies comparing the properties of each material can be assessed to come to definite conclusions.

CONCLUSION:

Within the limits of the study, we can derive that resin sealers followed by zinc oxide eugenol sealers and calcium hydroxide sealers are more preferred for performing root canal therap for patients below 18 years of age.

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Conflict of Interest:

No conflict of interest

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