COMPARATIVE EVALUATION OF EFFICACY OF DIFFERENT OBTURATION TECHNIQUES IN ROOT CANAL TREATED TEETH: AN IN-VITRO STUDY

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Abstract

Background: Obturation of the cleaned and formed root trench framework is a basic stride in root channel treatment to repress the entrance of microorganisms and their results into the cleaned and purified root waterway framework, and in addition keeping the recolonization of microbes staying after root channel treatment. Hence we planned the present study to assess the efficacy of different obturation techniques.

Materials & methods: The present study was conducted in the department of conservative dentistry of the dental institute and included assessment of 40 extracted human maxillary canines. After completion of biomechanical preparation, all the samples were randomly divided into two study groups with 20 teeth in each group; Group 1: Teeth which were obturated with lateral condensation (LC) technique, and Group 2: Teeth which were obturated with warm vertical compaction (WVC). All the results were compiled and analysed by SPSS software.

Results: The mean percentage of voids in the LC group samples was found to be 8.12 while mean percentage of voids in the WVC group was found to be 1.02.

Conclusion: LC technique was found to be associated with significantly higher obturating time.

Key words: Obturation, Root canal therapy, Teeth

INTRODUCTION

Obturation of the cleaned and formed root trench framework is a basic stride in root channel treatment to repress the entrance of microorganisms and their results into the cleaned and purified root waterway framework, and in addition keeping the recolonization of microbes staying after root channel treatment. Giving a filling in the root trench fit for fixing the coronal, apical, and parallel openings is one of the fundamental treatment destinations.¹ ² Fixing the root trench framework depends on the satisfactory adjustment of a filling material to pulverize the waterway space and its complexities: balances, deltas, isthmuses and sidelong canals. Obturation of the root channel framework hermetically, both apically and coronally, averts spillage and suturing of the root channel space.³ ⁶ Hence we planned the present study to assess the efficacy of different obturation techniques.

MATERIALS & METHODS

The present study was conducted in the department of conservative dentistry of the dental institute and included assessment of 40 extracted human
maxillary canines. Ethical approval was taken from institutional ethical committee. Exclusion criteria for the present study included:

- The roots with cracks,
- The root with caries,
- The teeth showing sign of external or internal resorption
- The teeth showing sign of canal calcification

To ensure that all the specimens were of the same length, they were resected at 12-14 mm from the apex using a water-cooled diamond bur and then stored in normal saline. All the procedures were performed by a single operator. The canals were accessed and the working length (WL) was determined by inserting a #15 K-file (Mani, Nakanishi Inc., Tokyo, Japan) into the canal until it was just visible at the apical foramen; then 1 mm was subtracted from the measurement. The root canals were prepared using ProTaper rotary Ni-Ti instruments on an electrical endodontic handpiece at 250 rpm. Preparation was carried out according to manufacturer’s recommendations using the crown-down technique. Briefly, the S1 file was used to clean and shape the coronal part of the canal. Subsequently, the SX file was used to increase the taper of the coronal region and S1, S2, F1, F2 and F3 were used sequentially to the full working length. A 15% EDTA gel preparation (Glyde; Dentsply Maillefer) was used as a chelating agent, being introduced into the canal on the tip of each successive instrument. After completion of biomechanical preparation, all the samples were randomly divided into two study groups with 20 teeth in each group;

- Group 1: Teeth which were obturated with lateral condensation (LC) technique, and
- Group 2: Teeth which were obturated with warm vertical compaction (WVC)

All the results were compiled and analysed by SPSS software. Chi-square test was used for assessing and comparing their efficacies.

**RESULTS**

Table 1 shows the mean percentage of voids in the samples of both the study groups. The mean percentage of voids in the LC group samples was found to be 8.12 while mean percentage of voids in the WVC group was found to be 1.02. The obturation time was found to be higher in the LC group.

**DISCUSSION**

Sealing the root canal system is an important step in root canal treatment for a successful outcome. Several techniques and materials have been introduced for a three-dimensional obturation with higher density and homogeneity. Void-free filled canals carry a lower risk of apical periodontitis. Gutta-percha has long been used as a popular root filling material. The chemical and physical properties of gutta percha enable its application in several obturation techniques. Hence we planned the present study to assess the efficacy of different obturation techniques. In the present study, we observed that LC technique was more time-consuming than WVC. Samiei M et al. evaluated the sealing ability of single-cone obturation technique with mineral trioxide aggregate and calcium-enriched mixture based on bacterial leakage approach. Sixty-four single-canal teeth were prepared and randomly divided into 5 groups, consisting of three experimental groups (n = 16) and two control groups (n = 8). In group 1, root canal obturation was performed using gutta-percha with 0.02 taper and AH26 sealer by lateral compaction technique. In groups 2 and 3, single Protaper gutta-percha cone was used for obturation with MTA and CEM cement, respectively. A bacterial leakage apparatus was utilized for leakage assessment for 60 days. Leakage comparison between the experimental groups was performed by one-way ANOVA using SPSS 16 statistical software. The mean bacterial leakage intervals in groups 1, 2 and 3 were 33.68 ± 9.39, 40.68 ± 11.03 and 39.56 ± 9.03 days, respectively. One-way ANOVA indicated no significant differences in bacterial leakage between the three experimental groups (P = 0.109). Single-cone obturation with well-fitted gutta-percha and MTA and CEM cement is an appropriate alternative for traditional lateral compaction technique. Sadr S et al compared the sealing ability of three root canal sealers AH-26, glass ionomer cement (GIC) and zinc oxide eugenol (ZOE) in single gutta-percha obturating system. Seventy extracted single-rooted human teeth were decoronated. The teeth were

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<th>Groups</th>
<th>Mean percentage of voids</th>
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<td>8.12</td>
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<tr>
<td>WVC group</td>
<td>1.02</td>
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**Table 1: Mean percentage of voids in both the study groups**
randomly divided into 3 experimental groups (n=20) and 2 positive and negative control groups. After root canal preparation, canals were obturated with single-cone method using either AH-26, GIC and ZOE. The leakage was evaluated using the dye penetration method. The samples were sectioned to evaluate the linear leakage using a stereomicroscope. The data were analyzed using the One-way ANOVA test. All the specimens in the positive control group showed evidence of leakage. In the experimental groups, the lowest leakage scores were observed in the AH-26 group (P<0.05). However, there were no statistically significant differences between GIC and ZOE samples (P=0.676). AH-26 showed a superior seal and less microleakage compared to the two other materials in single gutta-percha obturating system.14

CONCLUSION
From the above results, the authors concluded that in comparison WVC technique, LC technique was more time-consuming. However, future studies are recommended.

REFERENCES

Source of support: Nil
Conflict of interest: None

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