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ORIGINAL RESEARCH

Assessment of efficacy of apical sealing ability of gutta-percha by lateral Condensation technique and Injectable thermoplasticized gutta-percha technique (Obtura II): A comparative study

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ABSTRACT:

Background: Contemporary endodontic obturation includes thermoplasticised techniques, such as warm vertical condensation and core-carrier obturation. The present study was undertaken for evaluating and comparing the apical sealing ability of gutta-percha by lateral Condensation technique and Injectable thermoplasticized gutta-percha technique (Obtura II). **Materials & methods:** A total of 40 extracted maxillary canines were included and were stored in normal saline. Access opening was done and biomechanical preparation was done. Pro Taper rotary files were used to clean and shape the canals using 17% EDTA as a canal lubricant. Obturation was done according to the following groups with 20 specimens in each group: Group-A Lateral condensation obturation technique, and Group-B Injectable thermoplasticized gutta-percha obturation technique (obtura II). The roots were immersed in a sealed bottle containing 2% Methylene blue dye upto 3 mm from the apical portion of the root leaving rest of the root portion out of dye. The extent of Dye penetration was measured using Stereo microscope of 20x magnification. **Results:** Mean microleakage among the specimens of group A and group B was 2.63 mm and 3.12 mm respectively. While analysing statistically, non-significant results were obtained while comparing the mean microleakage among specimens of group A and group B. **Conclusion:** Both the obturation techniques can be used with equal efficacy in patients undergoing root canal therapy.

Key words: Obturation, Gutta-percha, Condensation, Obtura II.

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INTRODUCTION

A key to successful endodontics and a major goal of contemporary nonsurgical root canal treatment is to seal completely both the apical and coronal avenues of potential leakage and maintain the disinfected status reached by the chemical and mechanical cleaning to prevent reinfection and percolation of bacterial substrates, allowing the periodontium to maintain its integrity and to achieve healing.¹ Cold lateral condensation, after being successfully tested and used, has set the golden standard in endodontics. However, it has been found that cold gutta-percha (GP) techniques rely heavily on a root canal sealer to address the problem of the accessory anatomy, as the

core filling material does not move out of the main canal.

Only voids and spreader tracts are reported.²⁻⁴

Contemporary endodontic obturation includes thermoplasticised techniques, such as warm vertical condensation and core-carrier obturation. These obturation methods make use of heat to plasticise the gutta-percha for higher degree of homogeneity and better canal adaptation. A survey in the USA reported that core-carrier obturation was the second most frequently used obturation method among general dentists.⁵⁻⁷ Hence; under the light of above mentioned data, the present study was undertaken for evaluating and comparing the apical sealing ability of gutta-

percha by lateral Condensation technique and Injectable thermoplasticized gutta-percha technique (Obtura II).

MATERIALS & METHODS

The present study was conducted for evaluating and comparing the apical sealing ability of gutta-percha by lateral Condensation technique and Injectable thermoplasticized gutta-percha technique (Obtura II). A total of 40 extracted maxillary canines were included and were stored in normal saline.

Inclusion Criteria:

- Caries free
- Completely formed
- Single rooted with an unobliterated straight canal.

Removal of debris was done from the extracted teeth with an ultrasonic scaler. The teeth was then be placed into 3% NaOCL for 8 hours to remove any organic debris after cleaning, teeth were rinsed and stored in saline. Access opening was done and biomechanical preparation was done. Pro Taper rotary files were used to clean and shape the canals using 17% EDTA as a canal lubricant. Obturation was done according to the following groups with 20 specimens in each group.

- Group-A Lateral condensation obturation technique
- Group-B Injectable thermoplasticized gutta-percha obturation technique (obtura II)

All canal preparations and obturations were performed by the operator under aseptic environment throughout this study. All the teeth were coated except the apical 3 mm with two layers of nail varnish, allowing each layer to dry between coats. The roots were immersed in a sealed bottle containing 2% Methylene blue dye upto 3 mm from the apical portion of the root leaving rest of the root portion out of dye. The extent of Dye penetration was measured using Stereo microscope of 20x magnification. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Mann-Whitney U test was used for evaluation of level of significance.

RESULTS

In the present study, a total of 40 extracted tooth specimens were included and were broadly divided into two study groups as follows: Group-A Lateral condensation obturation technique, and Group-B Injectable thermoplasticized gutta-percha obturation technique (obtura II). Mean microleakage among the specimens of group A and group B was 2.63 mm and 3.12 mm respectively. While analysing statistically, non-significant results were obtained while comparing the mean microleakage among specimens of group A and group B.

Table 1: Mean microleakage

Group	Microleakage (mm)	
	Mean	SD
Group A	2.63	0.82
Group B	3.12	1.07
U- value	125.82	
p- value	0.7120 (Non-Significant)	

DISCUSSION

The root canals are provided with accessory and lateral channels, bag bottoms and communications between different conduits. Some of these areas are difficult to seal using traditional techniques. The lateral filling technique has been the most widely used. However, with this method many irregularities occur in the final mass of the gutta-percha as well as difficulty in reproducing some channels and existing anfractuositities. In order to eliminate some of these problems, the technique of vertical condensation of tempered gutta-percha was described. From here, new methods were introduced that employ thermoplasticized gutta-percha at high or low temperature. Different studies have shown that these techniques achieve a better seal.⁶⁻⁹ Hence; under the light of above mentioned data, the present study was undertaken for evaluating and comparing the apical sealing ability of gutta-percha by lateral Condensation technique and Injectable thermoplasticized gutta-percha technique (Obtura II).

In the present study, a total of 40 extracted tooth specimens were included and were broadly divided into two study groups as follows: Group-A Lateral condensation obturation technique, and Group-B Injectable thermoplasticized gutta-percha obturation technique (obtura II). Mean microleakage among the specimens of group A and group B was 2.63 mm and 3.12 mm respectively. Sinhal TM et al evaluated sealing ability of newly introduced C-point system, cold lateral condensation, and thermoplasticized gutta-percha obturating technique using a dye extraction method. Sixty extracted maxillary central incisors were decoronated below the cemento-enamel junction. Working length was established, and biomechanical preparation was done using K3 rotary files with standard irrigation protocol. Teeth were divided into three groups according to the obturation protocol; Group I-Cold lateral condensation, Group II-Thermoplasticized gutta-percha, and Group III-C-Point obturating system. After obturation all samples were subjected to microleakage assessment using dye extraction method. One-way analysis of variance revealed that there is significant difference among the three groups with P value ($0.000 < 0.05$). Tukey's HSD post hoc tests for multiple comparisons test shows that the Group II and III perform significantly better than Group I. Group III performs better than Group II with no significant difference. All the obturating technique showed some degree of microleakage. Root canals filled with C-point system showed least microleakage followed by

thermoplasticized obturating technique with no significant difference among them.¹⁰

In the present study, while analysing statistically, non-significant results were obtained while comparing the mean microleakage among specimens of group A and group B. Safai P et al compared microleakage in a tapered single-cone method versus lateral and vertical condensation after diving simulation. One hundred and thirty five extracted single-rooted teeth were used. Following instrumentation and irrigation to #30.06 Mtwo rotary system, obturations were performed in three groups of 45 teeth: Group 1, tapered single-cone with Endoseal MTA sealer; Group 2, lateral condensation with AH26 sealer; Group 3, vertical condensation with AH26 sealer. Then all specimens were divided into three groups and incubated at ambient room pressure (101.3 kPa), 203 kPa or 304 kPa for 120 minutes respectively 20 times over one month to simulate diving conditions. Microleakage quantitative analysis was recorded by using a 2% Methylene blue dye for 24 hours. The amounts of microleakage increased with increasing pressure in all obturation groups; however, the differences were not statistically significant ($P > 0.05$). At all three pressures, the least microleakage was recorded in Group 3, vertical condensation. Although the differences between vertical condensation, lateral condensation, and tapered single-cone methods were statistically significant ($P < 0.001$), the vertical condensation and lateral condensation groups did not differ from each other ($P > 0.05$). Vertical condensation may be the best technique, based on sealing ability, for people who frequently experience pressure alterations.¹¹

CONCLUSION

From the above results, the authors concluded that both the obturation techniques can be used with equal efficacy in patients undergoing root canal therapy. However; further studies are recommended.

REFERENCES

1. Ingle JJ, editor. Obturation of the radicular space. 5th ed. Hamilton, Canada: 2008. Endodontics; p. 571.
2. Weller RN, Kimbrough WF, Anderson RW. A comparison of thermoplastic obturation techniques: Adaptation to the canal walls. *J Endod.* 1997;23:703–6.
3. Estrela C, Holland R, Estrela CR, Alencar AH, Sousa-Neto MD, Pécora JD. Characterization of successful root canal treatment. *Braz Dent J.* 2014 Jan-Feb;25(1):3-11.
4. Chu CH, Lo EC, Cheung GS. Outcome of root canal treatment using Thermafil and cold lateral condensation filling techniques. *Int Endod J.* 2005;38(3):179–185.
5. Glickman GN, Koch KA. 21ST-century endodontics. *JADA.* 2000;131, Supplement 1(0):39S-46S.
6. Neukermans M, Vanobbergen J, De Bruyne M, Meire M, De Moor RJ. Endodontic performance by Flemish dentists: have they evolved? *Int Endod J.* 2015;48(12):1112–21.

7. Johnson WB. A new gutta-percha technique. *J Endod.* 1978;4:184–188.
8. Peng B, Wu J, Fan B, Bian Z. Clinical research on Thermafil obturation technique. *J Dent Res.* 2002;81:B221-B
9. Budd CS1, Weller RN, Kulild JC. A comparison of thermoplasticized injectable gutta-percha obturation techniques. *J Endod.* 1991 Jun;17(6):260-4.
10. Sinhal TM, Shah RP, Jais PS, Shah NC, Hadwani KD, Rothe T, Sinhal NN. An In vitro comparison and evaluation of sealing ability of newly introduced c-point system, cold lateral condensation, and thermoplasticized gutta-percha obturating technique: A dye extraction study. *Contemp Clin Dent* 2018;9:164-9
11. Safai P, Farzaneh B, Fekrazad R. The effects of pressure in vitro on three methods of root canal obturation. *Diving Hyperb Med.* 2019;49(1):16–20.