International Journal of Research in Health and Allied Sciences
Journal home page: www.ijrhas.com
Official Publication of "Society for Scientific Research and Studies" [Regd.]
ISSN: 2455-7803

Original Research

Comparison of two different types of techniques for obturation of endodontic canals using gutta percha

Abhinav Dabra[1], Jasleen Kaur[2], Mehakjot Kaur[3], Muskan Sachdeva[4], Navneet Kaur[5], Nikita Duggal[6]

[1] BDS Intern-Dasmesh Institute of Research and Dental Sciences, Faridkot, Punjab, India;
[2,3,5,6] Former BDS Graduate Student ,Dasmesh Institute of Research and Dental Sciences, Faridkot, Punjab, India;
[4] Former BDS Graduate Student, Christian Dental College and Hospital, Ludhiana, Punjab, India

***ABSTRACT*:**
Background: 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. **Aim of the study:** To compare two different techniques of gutta percha condensation in endodontic canals. **Materials and methods:** The study was conducted in the Department of Conservative Dentistry and Endodontics of the Dental Institution. For the study, we selected 40 extracted permanent maxillary central incisors with single canal and completed apex. Teeth with morphological and developmental anomalies were excluded from the study. We kept the teeth immersed in normal saline from the day of extraction to the day commencing the study. **Results:** A total of 40 extracted maxillary central incisors were used in the study. Teeth were randomly grouped into two groups with 20 teeth in each group. Teeth were weighed before and after the completion of obturation. The difference between initial and final weight after obturation of teeth was calculated and a list was formulated for both the groups. The mean weight of gutta percha for Group LC was 13.65 $\pm$ 1.25 g and Group MLC was 10.11 $\pm$ 0.9 g. **Conclusion**: Within the limitations of the study we conclude that Mechanical lateral condensation technique is superior to conventional lateral condensation technique in obturation of endodontic canals with gutta percha cones.
Key words: Endodontic canals, Root canals, Gutta percha.

Received: 20 June, 2018 Revised: 12 July, 2019 Accepted: 15 July, 2019

Corresponding Author: Dr. Abhinav Dabra, BDS Intern, Dasmesh Institute of Research and Dental Sciences, Faridkot, Punjab, India

This article may be cited as: Dabra A, Kaur J, Kaur M, Sachdeva M, Kaur N, Duggal N. Comparison of two different types of techniques for obturation of endodontic canals using gutta percha. Int J Res Health Allied Sci 2019;5(5):118-121.

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.[1,2] Ingle found that nearly 60% of endodontic failures were due to the incomplete obturation of the root canal system. Cold lateral condensation, after being successfully tested and used, has set the golden standard in endodontics.[3,4] However, it has been found that cold gutta-percha techniques rely heavily on a root canal sealer to address the problem of the accessory anatomy, as the core filling material will not move out of the main canal. Voids, spreader tracts, incomplete fusion of the gutta-percha cones, and lack of surface adaptation have been reported.[5,6] Hence, the present study was conductedto compare two different techniques of gutta percha condensation in endodontic canals.

MATERIALS AND METHODS:

The study was conducted in the Department of Conservative Dentistry and Endodontics of the Dental Institution. The ethical approval for study was obtained from ethical committee of the institute before beginning the study. For the study, we selected 40 extracted permanent maxillary central incisors with single canal and completed apex. Teeth with morphological and developmental anomalies were excluded from the study. We kept the teeth immersed in normal saline from the day of extraction to the day commencing the study. The crowns of the teeth were cut off using a slow speed disc bur. The working length of all the teeth was standardized to 19 mm. Biomechanical preparation (BMP) of the roots was done using hand K-files. The prepared teeth were randomly grouped into 2 groups with 20 teeth in each group, Group 1 and Group 2. In Group 1, the obturation was performed using conventional lateral condensation technique (LC) employing finger spreaders and in Group 2, the obturation was done using mechanical lateral condensation technique (MLC) employing a reciprocating handpiece for the same. The procedures on both the groups were performed by same operator to avoid any discrepancies. The obturation was done using size 30 gutta-percha master cone and size 15 gutta-percha accessory cones for both the groups. The weight of the obturated teeth was measured again. The difference between the weight of teeth before and after the obturation showed the weight of gutta percha mass.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

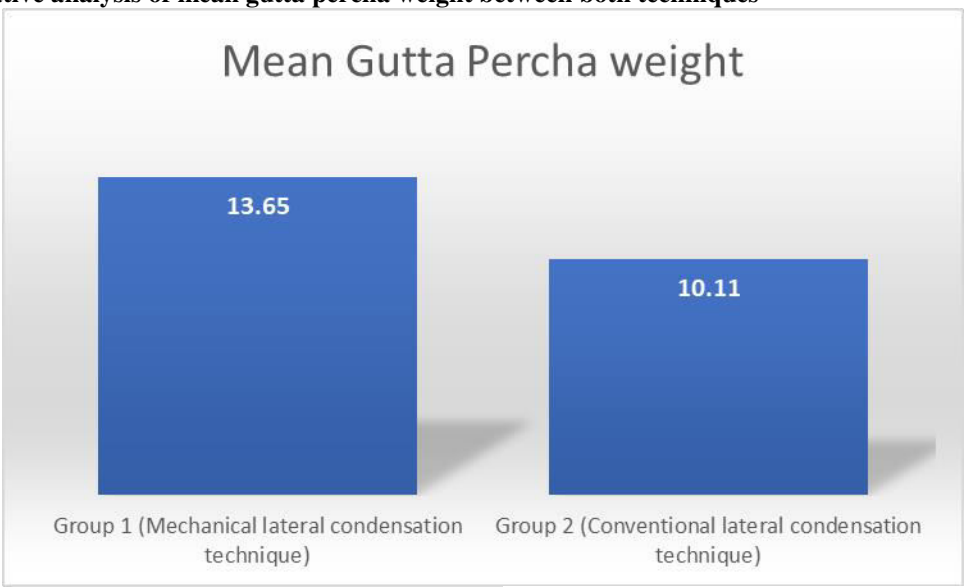
RESULTS:

A total of 40 extracted maxillary central incisors were used in the study. Teeth were randomly grouped into two groups with 20 teeth in each group. Teeth were weighed before and after the completion of obturation. The difference between initial and final weight after obturation of teeth was calculated and a list was formulated for both the groups. The mean weight of gutta percha for Group LC was **13.65 ± 1.25 g** and Group MLC was **10.11 ± 0.9 g**. The difference in weight of both the groups was statistically non-significant with a p value of 0.02. [Table 1 and Figure 1]

Table 1: Comparative analysis of mean gutta percha weight between both techniques

Groups	Mean Gutta Percha weight	p-value
Group 1 (Mechanical lateral condensation technique)	13.65 ± 1.25 g	**0.09**
Group 2 (Conventional lateral condensation technique)	10.11 ± 0.9 g	

Fig 1: Comparative analysis of mean gutta percha weight between both techniques



DISCUSSION:

In the present study, we observed that mean weight of Gutta-percha was significantly higher in Group MLC as compared to Group LC depicting that density of gutta-percha is more efficient with MLC technique. Hasheminia SM et al evaluated and compared the incidence of dentinal defects following root canal obturation with two different

techniques. A total of 110 mesial roots of human mandibular first molars were selected. Twenty-seven roots were left unprepared as negative controls (NCs). The mesiobuccal canals of 83 roots were prepared using rotary instruments. Twenty-seven roots were left unobturated as positive controls (PCs). Twenty-eight roots were obturated with cold lateral compaction (CLC) technique and the others were obturated with mechanical lateral compaction (MLC) technique. In the CLC and MLC groups, spreader penetration depth was measured by an electromechanical testing machine in canals containing master Gutta-percha cones. After root canal obturation, all the roots were sectioned horizontally at four levels from the apex and evaluated under a stereomicroscope at a magnification of ×40. The presence of dentinal defects was noted. Data were analyzed using the Chi-square and t-tests. The number of

defects was not significantly different between the CLC, MLC, and PC groups. The CLC, MLC, and PC groups had significantly more defects compared to the NC group. According to the results of this study, the MLC and CLC techniques were the same in producing dentinal defects. Carvalho-Sousa B et al compared the ability of three filling techniques to fill simulated lateral canals. Thirty extracted, single-rooted human teeth were used. After cleaning and shaping, three lateral canals were created, one in each third. The teeth were randomly separated into three groups: continuous wave of condensation (Group 1); thermomechanical compaction (Group 2); and lateral condensation (Group 3). The teeth were cross-sectioned, making the cut through points over the lateral canals; thus, 90 specimens were obtained. Each specimen was immersed in a polyester resin, and the blocks were polished. Images were obtained using a stereoscopic lens (40x). Radiographic analysis was performed, followed by a filling linear measure using the Image Tool 3.0 program (University of Texas). Data were statistically analyzed using SPSS 12.0 for Windows (Kruskal-Wallis test). A greater number of simulated lateral canals were obturated in Groups 1 and 2. Group 2 presented the largest percentage of linear measure of lateral canals filling with gutta-percha and sealer. No statistical differences were found between Group 1 and Group 2 when we analyzed the filling with gutta-percha and sealer or just sealer. They concluded that thermoplasticized gutta-percha filling techniques (Groups 1 and 2) are better for filling lateral canal with gutta-percha and sealer or with just sealer than lateral condensation (Group 3).[7, 8]

Clinton, Kenan et al compared a warm gutta-percha obturation technique, Thermafil Plus (Tulsa Dental, Tulsa OK), with lateral condensation for the ability to adapt gutta-percha to the walls of a root canal system. An extracted sectioned and mounted maxillary central incisor had canal irregularities created and was subsequently subjected to multiple obturations using both techniques. Length of fill, replication to working length, number of artificial depressions replicated, quality of replications, number of voids, and general appearance of obturation were all evaluated using standardized criteria. Data evaluation consisted of a one way analysis of variance on the same type defects between obturation groups followed by a Scheffé post-hoc test. A statistically significant difference was found between the groups in each category of evaluation. Gutta-percha using Thermafil was better able to flow into lateral spaces, had fewer voids, and replicated the surface of the root better. It also, however, was extruded out the apical foramen more than in the lateral condensation group. Kumar NS et al evaluated and compared the sealing ability between the clod lateral condensation, thermoplasticized gutta-percha, and flowable gutta-percha obturation technique, under a stereomicroscope at ×40 magnification. Sixty single rooted teeth were selected and canals were shaped with K3 NiTi files. Irrigation was performed with 5.25% NaOCl and 17% ethylenediaminetetraacetic acid (EDTA). The teeth were then separated into three groups depending on the type of obturation technique: Group A, obturated using the lateral condensation technique and AH Plus sealer; Group B, obturated with thermoplasticized gutta-percha tech (Obtura III Max) and AH Plus sealer; and Group C, obturated using flowable gutta-percha technique (GuttaFlow). After storing the teeth in 100% humidity for 7 days at 37°C, the roots of the teeth were sectioned at five levels. The sections were then observed under a stereomicroscope at ×40 magnification and the images were analyzed for area of voids (AV) and frequency of voids. The data were statistically analyzed using the SPSS version 17 software. The 95% confidence intervals (CI) were calculated. One-way analysis of variance with post hoc test and non-parametric Mann–Whitney U test were carried out to compare the means. The lowest mean of AV was recorded in the thermoplasticized gutta-percha (Obtura III Max) group [1.0% (95% CI=0.5–1.5)]. This was statistically and significantly different from flowable gutta-percha (GuttaFlow) group [3.0% (95% CI=2.1–3.9)]. There was no significant difference between the thermoplasticized gutta-percha group and lateral condensation group [1.6% (95% CI=1.0–2.2)] with regard to the AV, but there was a statistically significant difference between the lateral condensation and flowable gutta-percha groups. The flowable gutta-percha group showed the maximum number of voids [56% (95% CI=48–64)], which was significantly higher than those in the lateral condensation [26% (95% CI=19–34)] and thermoplasticized gutta-percha [15% (95% CI=10–21)] groups. They concluded that the thermoplasticized gutta-percha technique (Obtura III Max) had better adaptability to the canal walls when compared to the flowable gutta-percha (GuttaFlow) obturation and lateral condensation techniques.[9, 10]

CONCLUSION:

Within the limitations of the study we conclude that Mechanical lateral condensation technique is superior to conventional lateral condensation technique in obturation of endodontic canals with gutta percha cones.

REFERENCES:

1. Rubach WC, Mitchell DF. Periodontal disease, accessory canals and pulp pathosis. J Periodontol. 1965;36:34–38.
2. De Deus QD. Frequency, location and direction of the lateral, secondary and accessory canal. J Endod. 1975;1:361–366.
3. Davalou S, Gutmann A, Nunn MK. Assessment of apical and coronalroot canal seals using contemporary endodontic obturation andrestorative materials and techniques. Int Endod J. 1999;32:388–96.
4. Sjogren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontictreatment of teeth with apical periodontitis. Int Endod J. 1997;30:297–306.
5. Ingle JI. Obturation of the radicular space. 5th. Endodontics; p. 571.
6. Weller RN, Kimbrough WF, Anderson RW. A comparison of thermoplastic obturation techniques: Adaptation to the canal walls. J Endod. 1997;23:703–6.
7. Hasheminia SM, Farhad AR, Saatchi M, Nejad HS, Sanei M. Mechanical or cold lateral compaction: The incidence of dentinal defects. Dent Res J (Isfahan). 2015;12(6):513–519.
8. Carvalho-Sousa B, Almeida-Gomes F, Carvalho PR, Maníglia-Ferreira C, Gurgel-Filho ED, Albuquerque DS. Filling lateral canals: evaluation of different filling techniques. Eur J Dent. 2010;4(3):251–256.
9. Clinton, Kenan &Himel, T. (2001). Comparison of a Warm Gutta-Percha Obturation Technique and Lateral Condensation. Journal of endodontics. 27. 692-5. 10.1097/00004770-200111000-00010.
10. Kumar NS, Prabu PS, Prabu N, Rathinasamy S. Sealing ability of lateral condensation, thermoplasticized gutta-percha and flowable gutta-percha obturation techniques: A comparative in vitro study [retracted in: J Pharm Bioallied Sci. 2015 Aug;7(Suppl 2):S830]. J Pharm Bioallied Sci. 2012;4(Suppl 2):S131–S135. doi:10.4103/0975-7406.100211