

# International Journal of Research in Health and Allied Sciences

Journal home page: [www.ijrhas.com](http://www.ijrhas.com)

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

Index Copernicus value [ICV] = 68.10;

## ORIGINAL RESEARCH

### Comparison of efficacy of different obturation techniques

Shelly Singh

Clinic Head and Sr. Consultant Endodontist, Clove Dental, Panchkula sector 20, Chandigarh tricity zone, 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 / or 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 efficacy of different obturation techniques. **Materials and methods:** The present study was conducted in the Department of Endodontics and Conservative Dentistry of the Dental institution. We selected 40 permanent maxillary central incisors with single canal and completed apex formation. We excluded teeth with morphological anomalies and multiple root canals to avoid any bias in the results. For the preparation of root canals, access cavity was made and the canal was located using a #8 K-file. After the canals were located, we cut the crowns of the teeth such that the working length of the canal was standardized at 22 mm for all teeth. The biomechanical preparation of the canals was done using K-files. After completion of the biomechanical preparation of the canal, the teeth were randomly grouped into two groups, Group A and B, with 20 teeth in each group. **Results:** Mean gutta percha weight in Group A which were obturated with mechanical lateral condensation technique was  $11.36 \pm 1.2$  g. Mean gutta percha weight in Group B which were obturated with conventional lateral condensation technique was  $8.9 \pm 1.6$  g. **Conclusion:** Within the limitations of the present study, it can be concluded that mechanical lateral condensation and Conventional lateral condensation techniques are quite effective in sealing the root canal; however, our study has demonstrated that MLC is superior to CLC.

**Keywords:** Obturation, root canal, lateral condensation, endodontic.

Received: 12 April, 2020

Accepted: 24 April, 2020

**Corresponding author:** Dr. Shelly Singh, Clinic Head and Sr. Consultant Endodontist, Clove Dental, Panchkula sector 20, Chandigarh tricity zone, India

**This article may be cited as:** Singh S. Comparison of efficacy of different obturation techniques. Int J Res Health Allied Sci 2020; 6(3):51-54.

#### 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 / or mechanical cleaning, to prevent reinfection and percolation of bacterial substrates, allowing the periodontium to maintain its integrity and to achieve healing.<sup>1-4</sup> Ingle found that nearly 60% of endodontic failures were due to the incomplete obturation of the root canal system.<sup>5</sup> Although there are many techniques for obturation of root canals, but still search is on for better techniques,

as cold lateral condensation (CLC) technique, the most frequently used technique and the standard with which all other techniques are compared, results in creation of voids, spreader tracts and lack of surface adaptation to canal walls.<sup>6</sup> Hence, the present study was conducted to compare efficacy of different obturation techniques.

#### MATERIALS AND METHODS:

The present study was conducted in the Department of Endodontics and Conservative Dentistry of the Dental institution. The study was approved from the ethical committee of the institute prior to commencement of the study. For the study, we used extracted permanent

teeth. We selected 40 permanent maxillary central incisors with single canal and completed apex formation. We excluded teeth with morphological anomalies and multiple root canals to avoid any bias in the results. The teeth were immersed in the dilute hypochlorite solution for 48 hours to remove any organic debris on the teeth. After 48 hours, the teeth were immersed in the normal saline solution until the commencement of the study.

For the preparation of root canals, access cavity was made and the canal was located using a #8 K-file. After the canals were located, we cut the crowns of the teeth such that the working length of the canal was standardized at 22 mm for all teeth. The biomechanical preparation of the canals was done using K-files. After completion of the biomechanical preparation of the canal, the teeth were randomly grouped into two groups, Group A and B, with 20 teeth in each group. The teeth in Group A were obturated with size 30 gutta-percha master cone and size 15 gutta-percha accessory cones with conventional lateral condensation technique using finger spreaders. The teeth in Group B were obturated with size 30 gutta-percha master cone and

size 15 gutta-percha accessory cones using mechanical lateral condensation technique (MLC) employing a reciprocating handpiece. All the procedures were performed by a single operator. The teeth were weighed before and after the completion of obturation. This difference in weight showed the weight of gutta percha mass. The data was stored for further evaluation.

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.

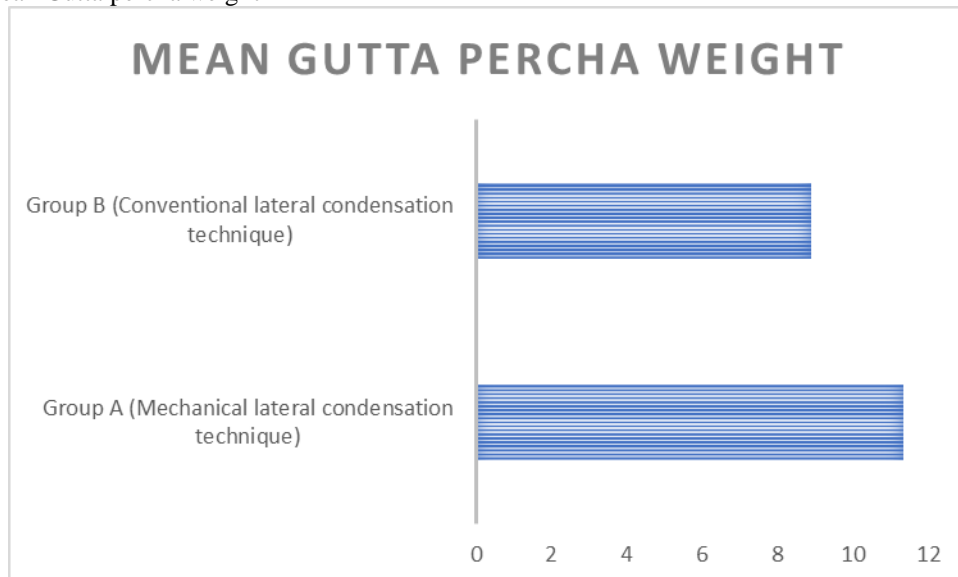
**RESULTS:**

Table 1 shows the mean gutta percha weight in both the techniques. Mean gutta percha weight in Group A which were obturated with mechanical lateral condensation technique was  $11.36 \pm 1.2$  g. Mean gutta percha weight in Group B which were obturated with conventional lateral condensation technique was  $8.9 \pm 1.6$  g. On comparing the results, it was seen that the results are statistically significant ( $p < 0.05$ ) [Fig 1]

**Table 1:** Mean gutta percha weight in Group A and Group B

Groups	Mean Gutta Percha weight	p-value
Group A (Mechanical lateral condensation technique)	$11.36 \pm 1.2$ g	<b>0.003</b>
Group B (Conventional lateral condensation technique)	$8.9 \pm 1.6$ g	

**Figure 1:** Mean Gutta percha weight



**DISCUSSION:**

In the present study, we observed that the weight of gutta percha was more in teeth with mechanical lateral condensation. The teeth which were obturated with lateral condensation technique were less in weight than former technique. The results were compared with previous studies. Samadi F et al evaluated the percentage of gutta-percha-filled area (PGFA) using microscopic analysis of the cross-sections in the apical third of root canals when filled either with Thermafil technique, Warm Vertical Condensation technique and Cold Lateral Condensation technique without using sealers. Sixty single rooted extracted permanent teeth were collected. After crown amputation, the teeth were randomly divided into three experimental groups of 20 specimens each. Group I—Thermafil obturation technique, group II—warm vertical condensation obturation technique and group III—cold lateral condensation obturation technique. Obturation was performed by specific techniques without using sealers. After obturation, the teeth were cross-sectioned horizontally at 2 to 3 mm from apex with the help of double sided diamond disk. Sections were digitally photographed and measured under Stereomicroscope at magnification of 50×. Using a KS 100 imaging system the area of canals and the gutta-percha was recorded, also the percentage of gutta-percha filled area (PGFA) was calculated. Maximum group difference was observed between groups I and III ( $3.558 \pm 0.138$ ) while minimum difference was observed between groups I and II ( $1.223 \pm 0.137$ ). Thus, all the between group differences were statistically significant. They concluded that the Thermafil Obturation technique produces significantly higher percentage of gutta-percha filled area (PGFA) than the warm vertical condensation technique or cold lateral condensation technique. Aminsobhani M et al conducted study with aim to introduce modified continuous wave compaction (MCWC) technique and compare its obturation quality with that of lateral compaction (LC), warm vertical compaction (WVC) and continuous wave compaction techniques (CWC). The obturation time was also compared among the four techniques. Sixty-four single-rooted teeth with 0–5° root canal curve and 64 artificially created root canals with 15° curves in acrylic blocks were evaluated. The teeth and acrylic specimens were each divided into four subgroups of 16 for testing the obturation quality of four techniques namely LC, WVC, CWC and MCWC. Canals were prepared using the Mtwo rotary system and filled with respect to their group allocation. Obturation time was recorded. On digital radiographs, the ratio of area of voids to the total area of filled canals was calculated using the Image J software. Adaptation of the filling materials to the canal walls was assessed at three cross-sections under a stereomicroscope (X30). No significant difference

existed in adaptation of filling materials to canal walls among the four subgroups in teeth samples; but, in artificially created canals in acrylic blocks, the frequency of areas not adapted to the canal walls was significantly higher in LC technique compared to MCWC. The void areas were significantly more in the LC technique than in other techniques in teeth. The longest obturation time belonged to WVC technique followed by LC, CW and MCWC techniques. The difference between the artificially created canals in blocks and teeth regarding the obturation time was not significant. Within the limitations of this in vitro study, MCWC technique resulted in better adaptation of gutta-percha to canal walls than LC at all cross-sections with fewer voids and faster obturation time compared to other techniques.<sup>7,8</sup>

Gupta R et al compared the quality of three different root canal obturation techniques: lateral compaction, Thermafil and Calamus by using cone beam computed tomography. A total of 30 central incisors were selected. Biomechanical preparation was done by Reciproc file no 25. Teeth were divided into 3 groups of 10 teeth each according to the obturation technique i.e. Calamus, Thermafil and lateral compaction. Cone beam computed tomography was used to measure filling area and voids at coronal, middle and apical third of the root canal after obturation by different techniques. Data was statistically analysed by One-Way Anova and multiple comparison of Tukey HSD tests. The maximum amount of obturating material was observed in Calamus group followed by Thermafil and lateral compaction. Minimum voids were seen in obturation by Calamus technique. They concluded that Calamus may be a good obturation technique. Gandhi M et al evaluated and compared the efficacy of different obturating methods used in primary teeth. Forty one patients aged four to nine years with a total of 60 teeth were selected. Out of the 60 teeth, 32 were primary mandibular first molars and 28 were primary mandibular second molars, the sample was randomly divided into three groups. Disposable syringe, lentulo spiral and past inject were used for obturation. Postoperative evaluation was done for; quality of canal obturation, presence of voids using postoperative radiographs following obturation of teeth. The data were analysed to assess the success rate of the three methods used for obturation using Chi-square test. Among the three groups of the study, past inject exhibited the maximum number of optimally filled canals. Maximum number of underfilled canals was found with lentulospiral, and the maximum number of overfilled canals was seen with disposable syringe. Least number of voids was observed in canals filled with the past inject technique and disposable syringe. The results suggest that the most successful technique for obturation of primary teeth was past inject.<sup>9,10</sup>

## CONCLUSION:

Within the limitations of the present study, it can be concluded that mechanical lateral condensation and Conventional lateral condensation techniques are quite effective in sealing the root canal; however, our study has demonstrated that MLC is superior to CLC.

## REFERENCES:

1. Davalou S, Gutmann JL, Nunn MH. Assessment of apical and coronal root canal seals using contemporary endodontic obturation and restorative materials and techniques. *Int Endod J.* 1999;32:388–96.
2. Sjögren U, Figdor D, Persson S, Sundqvist G. Sundqvist: Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J.* 1997;30:297–306.
3. Oguntebi BR. Dentine tubule infection and endodontic therapy implications. *Int Endod J.* 1994;27:218–22.
4. Peters LB, Wesselink PR, Moorer WR. The fate and the role of bacteria left in root dentinal tubules. *Int Endod J.* 1995;28:95–9.
5. Ingle JL. Obturation of the radicular space. 5th. *Endodontics*; p. 571.
6. Leonardo MV (Clinical Research Academic Group, São José dos Campos School of Dentistry, São Paulo State University, SP, Brazil) Goto EH, Torres CR, Borges AB, Carvalho CA, Barcellos DC. Assessment of the apical seal of root canals using different filling techniques. *J Oral Sci.* 2009 Dec;51(4):593–599.
7. Samadi F, Jaiswal J, Saha S, et al. A Comparative Evaluation of Efficacy of Different Obturation Techniques used in Root Canal Treatment of Anterior Teeth: An in vitro Study. *Int J Clin Pediatr Dent.* 2014;7(1):1-5. doi:10.5005/jp-journals-10005-1224
8. Aminsobhani M, Ghorbanzadeh A, Sharifian MR, Namjou S, Kharazifard MJ. Comparison of Obturation Quality in Modified Continuous Wave Compaction, Continuous Wave Compaction, Lateral Compaction and Warm Vertical Compaction Techniques. *J Dent (Tehran).* 2015;12(2):99-108.
9. Gupta R, Dhingra A, Panwar NR. Comparative Evaluation of Three Different Obturating Techniques Lateral Compaction, Thermafil and Calamus for Filling Area and Voids Using Cone Beam Computed Tomography: An In vitro study. *J Clin Diagn Res.* 2015;9(8):ZC15-ZC17. doi:10.7860/JCDR/2015/12218.6279
10. Gandhi M, Tandon S, Vijay A, Kalia G, Rathore K. Clinical Assessment of Various Obturating Techniques for Primary Teeth: A Comparative Study. *J Clin Diagn Res.* 2017;11(7):ZC48-ZC51. doi:10.7860/JCDR/2017/25818.10194