

A clinical study of the Post Operative Pain after Root Canal Obturation with Obtura-II & System-B, Warm Gutta-Percha Techniques

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Abstract: Objective: Determine the clinical response of post obturation pain after root canal obturation by using Obtura-II and System-B as root canal filling techniques and document the better success rate of thermoplastic technique for root canal obturation. **Method:** This study was a Cross-sectional comparative, clinical study. A total of 60 patients, divided in two groups of 30 each Group-A (Obtura-II) and Group-B (System-B). These cases were treated at Operative Dentistry Department, Institute of Dentistry, Liaquat University of Medical and Health Sciences Jamshoro during the period 20th Feb.2009 to 26th Aug. 2009. Data was analyzed by using statistical package of social sciences (SPSS) Version 10. The mean difference, standard deviation, range and frequency of both quantitative and qualitative variables developed with the help of SPSS analysis. **Results:** A total of 60 patients required endodontic treatment were included in this study and canals were obturated by two thermoplastic techniques. Patients were equally divided into two groups by using envelop method, for group A, root canals obturated by Obtura-II and group B by System-B. The result of this study shows not much significant different in post obturation pain within 72 hours between Obtura-II technique and System-B technique. But there is little edge to System-B over Obtura-II, may be because of inflammation due to heat of warm gutta-percha in the apical tissues. **Conclusion:** After the comparisons of post obturation pain within 72 hours between groups and after stratification of gender, age groups and location presented in table-4. Gender and age groups were not having effect on post obturation pain. While location of the tooth was having effect on post obturation pain in the first 24 hours of the treatment.

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1. Introduction

Complete obturation of the root canal system, with a dimensionally stable material, is a goal in conventional root canal therapy. A root filling comprised primarily of gutta-percha can satisfy this goal¹ vertical condensation of thermoplasticized gutta-percha can achieve this. Subsequent studies demonstrated that vertically condensed gutta-percha produced a seal similar to that produced by lateral condensation² and that replication of the canal morphology was superior to that achieved by lateral condensation³. Modifications to Schilder's technique have been advocated to improve its efficacy and efficiency. For example, the Touch 'n Heat endodontic heat source (EIE / Analytic) has been used to thermoplasticized gutta-percha⁴, supplanting a flame-heated spreader / carrier as originally advocated by Schilder. The System-B endodontic heat source unit (EIE / Analytic) was designed to modify Schilder's technique by obturating the root canal system with a single continuous wave of thermoplasticized gutta-percha⁵. Numerous investigators have expressed concern that the use of an uncontrolled heat source within the root canal may

have a deleterious effect on the periodontium. A temperature rise of 108°C, above normal body temperature is regarded as a critical level at which periodontal tissues could be adversely affected^{6,7}. Scientific research regarding the efficacy and safety of the System-B is lacking. Similarly, the Touch 'n Heat; used to modify Schilder's vertical condensation technique, has received little investigation, having been assumed to produce root fillings and root surface temperature elevations similar to those produced with a flame-heated spreader. The aims of this study is to compare the System-B heating device with obturation by a modified vertical condensation technique and using the Obtura-II, for the temperature changes at the root canal wall and external root surface during obturation with the postoperative pain. Gutta-percha in combination with a root canal sealer is the most commonly used filling material. The sealer fills the minor irregularities⁷ and acts as a lute between the gutta-percha and canal wall⁸. Some sealers shrink upon setting, whilst others are susceptible to decomposition⁹. The amount of sealer should be restricted to a thin layer between the gutta-percha and the walls of the canal, but it should

be sufficient to restrict the passage of microorganisms and their by-products that are responsible for periradicular disease^{10,11}. The purpose of this study was also to compare the penetration into artificial lateral canals, branching from a standard root canal, of various brands of gutta-percha cones when heated to different controlled temperatures and compacted under a fixed force. Since its introduction in 1914 by Callahan, gutta-percha has been the standard obturation material used in root canal therapy.

2. Material and Methods

This study was a Cross-sectional comparative, clinical study. A total of 60 patients, divided in two groups of 30 each Group-A (Obtura-II) and Group-B (System-B). These cases were treated at Operative Dentistry Department, Institute of Dentistry, Liaquat University of Medical and Health Sciences Jamshoro during the period 20th Feb.2009 to 26th Aug. 2009. Inclusion criteria were patients with non vital teeth, having irreversible pulpitis, permanent single rooted single canal teeth and either gender. Whereas, Exclusion criteria were teeth with apical radiolucency, teeth with open apices, teeth with resorbed roots and teeth with periodontal disease and mobility.

Data Collection:

Indicated patients of root canal treatment that full fills all the inclusion criteria were selected and were randomly allocated into two groups by envelop method marked as A and B. Purpose of study, procedure, risks and benefits of two obturation techniques were explained to patients and Informed Consent was taken (Annexure-III). Data collection Performa was designed specific to the requirement of the study. Detailed evaluation of patients was carried out and recorded in the data collection Performa, for each patient was treated. The history, clinical examination and pre-operative periapical X-ray of that particular tooth was taken. The techniques for both the groups were consisting of: access preparation, working length was determined by periapical radiograph. All the canals were prepared through crown down technique using G.G burs and files. After that irrigation with sodium hypochlorite 2.5% (Endo Wash, Star international USA) and then canals were dried with paper points. Group A patients canal was obturated with Obtura-II (Obtura Corp. USA) and group B patients by System-B (Sybron Endodontics USA). All patients were called on 3rd day; the patients were interviewed and inspected whether or not there were symptoms of pain. According to history of pain, patients were asked for marking a point on a 0-10 cm Visual Analogue Scale

(Annexure-I), anchored at each end by the phrases 'No Pain' (0) and 'Unbearable Pain' (10). Post-operative pain level was scored according to VAS and recorded in Performa (Annexure-I).

Data Analysis:

Data was analyzed by using statistical package of social sciences (SPSS) Version 10. The mean difference, standard deviation, range and frequency of both quantitative and qualitative variables developed with the help of SPSS analysis.

3. Results

A total of 60 patients required endodontic treatment were included in this study and canals were obturated by two thermoplastic techniques. Patients were equally divided into two groups by using envelop method, for group A, root canals obturated by Obtura-II and group B by System-B. Gender distribution according to groups is presented in figure-1. Proportion of gender was not significant between groups ($p=1.00$). Maxillary and mandibular tooth location in the mouth of patients is presented in figure-2. Thirty three (55%) maxillary teeth were treated and 27(45%) mandibular teeth were treated. In the other word post-operative pain was 2.87 times more likely in Obtura-II (group A) than System-B technique ($OR+2.87$; 95%CI: 0.95 to 8.69). Comparisons of post-operative pain within 72 hours between groups after stratification of gender, age groups and location were presented in table-1. Gender and age group were not effect on pain between groups. In mandibular teeth pain was significantly high in Obtura-II than System-B (fisher's exact test; $p=0.04$).

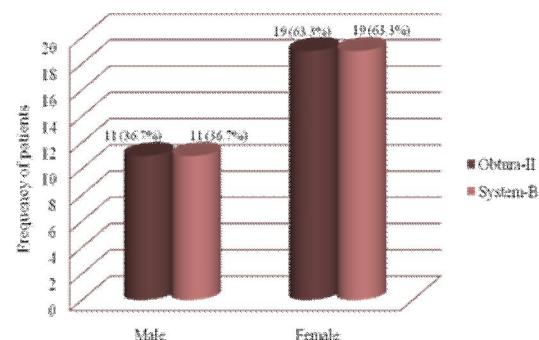


Figure: 1 gender distribution according to groups.

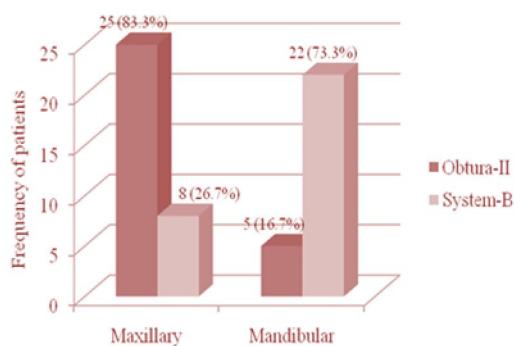


Figure – 2: location of tooth according to groups

Table – 1: Comparison of Intra Post Obturbation Pain between Groups within 72 Hours Controlling Gender, Age and Location of Teeth.

Control Variable	N	System-B (n=30)		Obtura-II (n=30)		P-Values
		Pain	No Pain	Pain	No Pain	
Gender						
Male	22	6	5	3	8	0.38
Female	38	8	11	4	15	0.29
Age groups						
≤ 32 years	30	14	14	2	0	0.48
> 32 years	30	0	2	5	23	0.58
Location						
Maxillary	33	2	6	7	18	0.87
Mandibular	27	12*	10	0	5	0.04*

4. Discussions

Postoperative pain after obturation was and remains one of the most common problems in endodontic treatment procedure, although in most cases do not last long, but could be a source of embarrassment to the dentist and annoying for the patient. Some studies investigating postoperative pain have been reported as incidence of moderate to severe pain in the range of 15% to 25%¹⁴. Studies also have reported frequencies of emergencies ranging from 1.4% to 16%¹ while in our study discomfort to mild post obturation pain noted from 35% to 46.7%.

In this study the frequency of post obturation pain has been assessed by visual analogue pain scale to compare Obtura-II and System-B, two different thermoplastic obturation techniques. Knowledge on the etiological factors and the mechanisms behind pain is very important for the practitioner to properly select the best obturation techniques. In this study we have found after the obturation with Obtura-II and System-B, that the rate of pain was high in group A (Obtura-II) than group B (System-B) but it is not statistically significant. Although the rate of the post obturation pain was high after using Obtura-II and that could be due to the amount of heat at the apex. It was not enough to bring the result to the significant level. In comparative study between both techniques

by the quantitative assessment Ruiz-Hubard EE, et al¹² concluded that Obtura-II technique, reported to produce more heat apically than System-B. Ferraz CC, et al also have found in their study that apical extrusion of warm gutta-percha technique were more in Obtura-II as it compare with System-B technique. As the age of the patient is concern in this study we have found that there is no relation between the age of the patients and the post obturation pain which mean that there was no statistically differences observed in different age groups in this study. Eleazer PD, Eleazer KR and Matusow whom they concluded that there is no significant relationship for post obturation pain with age. Several studies also have failed to find any relation between ages and post obturation pain Walton R, and Fouad A¹⁰. In their study they have fund that no relation between pain and age of the patient Imura N and Zolo M¹³ have also concluded the same result. Kane has found no relationship between post obturation pain and age. The reason could be due to a coronal transportation of the radiographic apex because of secondary cementum deposition with advancing age. This would result in an error of working length determination which could lead to extrusion of material and post preparation pain. After all in the current study and the above discussed studies we have concluded that there is no scientific evidence indicating that age is risk factor in the development of post obturation pain. As far as relation of the pain to gender is concern in this study we have found that no relation between the gender and post obturation pain which mean that there is no significant relation between gender and post obturation pain and the reason may be due to the small sample size of patients being checked in our study. However several studies have shown significant relation where large sample size of patients has been examined. Although it's hard to believe that women suffer from psychometric illness but physicians believe that their pain is directed by their emotional status¹³. Also the biological differences between genders explain the high incidence of pain in female as it compare to male. The reasons maybe due to difference in pelvic and reproductive organs which may provide an additional portal of entry of infection in female hormonal levels which may be associated with changing in the levels of serotonin and nor adrenaline causing increase in pain prevalence during the menstrual period. Our study has concluded that gender difference and female's predominance in the frequency of post obturation pain is more but it is not statistically significant. In this study the frequency of post obturation pain is more in the mandibular as it compare to maxillary teeth. In mandibular teeth pain was significant at 24 hours while at 72 hours it was

not significant. Kane found no correlation of post obturation pain with tooth type and that totally opposite to the result that we have concluded which similar to the result of Walton, Toosy, Fox, Mollar and Barnett. There is possible explanations for more pain in mandibular teeth as it compare to the maxillary teeth, and that is the cortical thicker plate of the mandible which may cause accumulation of exudates, causes more pressure as compared to maxilla.

Conclusions

The result of this study shows not much significant different in post obturation pain within 72 hours between Obtura-II technique and System-B technique. But there is little edge to System-B over Obtura-II, may be because of inflammation due to heat of warm gutta-percha in the apical tissues. After the comparisons of post obturation pain within 72 hours between groups and after stratification of gender, age groups and location presented in table-4. Gender and age groups were not having effect on post obturation pain. While location of the tooth was having effect on post obturation pain in the first 24 hours of the treatment.

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