

## EFFECT OF OCCLUSAL REDUCTION ON POST INSTRUMENTATION PAIN IN PATIENTS WITH ACUTE IRREVERSIBLE PULPITIS

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### ABSTRACT

*Pain management in endodontics is of paramount importance for the clinicians. The objective of the present study was to compare pain reduction after instrumentation, in teeth with occlusal reduction and without occlusal reduction. This randomized control trial study was conducted at Outpatient Department of Operative Dentistry at Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), PIMS, Islamabad from February 2015 to January 2016. A total of 250 patients with irreversible pulpitis and normal periapical radiographic appearance of posterior teeth were included in the present study. After administration of local anesthesia, the root canals were instrumented, and an intracanal calcium hydroxide dressing was placed. The patients were randomly allocated into 2 equal groups by random allocation software. Group 1 included 125 patients whose occlusal surface was reduced while group 2 included 125 patients with no occlusal reduction to be done. The patients were recalled after 24 hours, 2nd day and 3rd day to record their postoperative pain on the visual analogue scale (VAS). The final outcome that is mean post instrumentation pain score was measured by using t-test at 6th day of post instrumentation. Results were statistically significant and showed that occlusal reduction plays an important role in reducing post-instrumentation pain in patients undergoing endodontic treatment of posterior teeth.*

**Key Words:** Post instrumentation pain, occlusal reduction, irreversible pulpitis, pretreatment pain, endodontic treatment.

### INTRODUCTION

Despite advancements in endodontic treatment, post-instrumentation pain is still a debateable factor and of significant importance for both patients and clinicians.<sup>1</sup> Multiple factors are involved in causing post-operative pain in patients with acute irreversible pulpitis including patient related and clinician related factors.<sup>2,3</sup> Microorganisms play an important role and are considered to be one of the most important factor causing periapical pathologies. Other factors such as anxiety, fear, psychological, and behavioral dimensions including knowledge, beliefs, and attitudes also affect RCT patients, especially their pain experience.<sup>4</sup>

Several studies have been carried out to check the effectiveness of occlusal reduction after post-instrumentation

pain in patients undergoing endodontic treatment of posterior teeth. Many studies showed no effect of occlusal reduction in post-endodontic pain<sup>1,5,6</sup> but these studies have few limitations like small sample size, multi-visit endodontic treatment. Few studies also suggest that occlusal reduction at the initial visit is of utmost importance in this regard.<sup>11,12</sup> The objective of the present study was to assess the reduction in post-instrumentation pain in teeth with acute irreversible pulpitis with and without occlusal reduction.

### METHODOLOGY

This study was conducted on patients seen at the department of operative dentistry, Shaheed Zulfiqar Ali Bhutto Medical University, (PIMS) from February 2015 to January 2016. An approval for the proposed study was obtained from the ethical committee of PIMS/SZABMU. Sample size of 250 was determined by using WHO calculator. The inclusion criteria were physically healthy patients, posterior maxillary or mandibular teeth, prolonged pain to cold, normal periapical radiographic appearance, presence of an opposing tooth (or teeth) with normal occlusal contact with the opposing tooth (or teeth). The exclusion criteria

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were medically compromised patients, teeth without occlusal contact, mobility greater than grade 1, teeth in which instruments had been used beyond the apical foramen during root canal preparation, patients who had used preoperative antibiotics or analgesics during past 24 hours, teeth previously treated with root canal treatment.

After clinical and radiographic examination 250 patients that fulfilled the inclusion criteria were selected and divided into two groups 1 and 2 by using a computer generated list of random numbers with a randomization ratio of 1:1 produced by random allocation software (version 1.0, May 2004) with each group of 125 patients. Group 1 included patients with occlusal reduction while group 2 included patients with no occlusal reduction and were considered as control group. Endodontic procedure was performed by a single operator. After taking informed consent, VAS score was explained to the patients to rate their pain as 0 = no pain;

1-3 = mild pain; 4-6 = moderate pain; 7-9 = severe pain and asked them to fill pre-operatively. Teeth were anesthetized by using local anesthesia (Lignocaine 2% solution of 1:100000 epinephrine). Isolation was achieved using rubberdam. Access cavity was made using a round carbide bur (Mani ISO BR-31) and canals were located using endodontic explorer DG16. After confirming working length by radiographic method by using #8 and #10(k files, MANI) files, canal preparation was made till 20k file. After each instrumentation, 2.5% NaOCl was used as an intracanal irrigant. After canal preparation orifice widening was done by using Gates Glidden burs 1 and 2. Canals were filled with non-setting calcium hydroxide (METAPEX) after chemo mechanical preparation and tooth was sealed with temporary filling material (CAVIT, 3M ESPE).

For group 1 patients all occlusal contacts on the functional and nonfunctional cusps as well as on the marginal ridges were reduced by 1 mm by using a diamond bur in a high-speed handpiece with copious water spray. Patients were recalled to complete a VAS to rate their pain at 24 hours, 2 days, 3 days, 4 days, 5 days and 6 days postoperatively. Mean post instrumentation value was measured at 6 days followed by obturation that was the final outcome. Data were analyzed by another operator using SPSS 17. Mean 6 days post-instrumentation values were compared by using T-test. P-value less than 0.05 was considered significant.

## RESULTS

A total of 250 patients were included in the study. Among 250 patients, 130 were males and 120 were females as shown in Table 1. The final outcome of the present study that was calculated at 6 days post-oper-

atively showed that mean post-instrumentation pain score was significantly less in group 1 ( $2.60 \pm 0.70$ ) than in group 2 ( $4.40 \pm 0.97$ ) as shown in Table 2.

TABLE 1: GENDER DISTRIBUTION AMONG GROUP 1 & GROUP 2 PATIENTS

Variables	Group 1 n=125	Group 2 n=125
Gender Male	70	60
Female	55	65

TABLE 2: COMPARISON OF MEAN POST INSTRUMENTATION PAIN SCORE BETWEEN GROUPS AT 6 DAYS POST-OPERATIVELY

Post-instru- mentation pain	Group 1 n=125	Group 2 n=125	P-value
Mean $\pm$ SD	$2.60 \pm 0.70$	$4.40 \pm 0.97$	0.0002

## DISCUSSION

Main goal of endodontic procedure is to provide relief of pain to the patient and make the tooth functional. Teeth with irreversible pulpitis are therefore are of great concern for the dentist as well as for the patient. Several methods are used to relieve pain in such cases depending upon the factors causing pain. These methods include pain relief via medications postoperatively, local anesthesia administration, and occlusal reduction at first visit of endodontic treatment.<sup>1</sup>

Up till now researches are being carried out to assess pain after endodontic treatment because of the difference of pain prevalence from 3% to 58%.<sup>2</sup> Such a large difference is probably because of multiple factors that will affect the treatment that includes patient related factors and clinician related factors.<sup>3,6</sup> Patient related factors include difficulty in pain threshold, patients demographics like age, gender, health status<sup>4,9</sup> and clinician related factors include technique used for instrumentation, type of local anesthesia, intracanal medicament used, single visit vs multiple visit endodontic treatment and pre-operative pain status.<sup>1-3,7,8,14</sup>

Several studies showed no statistically significant differences of occlusal reduction in post instrumentation pain in patients who received endodontic treatment.<sup>5,10,11</sup> Study by Creech et al.<sup>5</sup> Parirokh et al.<sup>10</sup> and Asghar et al.<sup>11</sup> revealed no significant difference in the occurrence of post instrumentation pain during endodontic treatment with or without occlusal tooth reduction.

On the other hand a recent study by Sheikh et al.<sup>12</sup>, showed that occlusal reduction helps in the prevention of post instrumentation pain in teeth with irreversible pulpitis, sensitivity to percussion, pre-treatment pain and absence of peri-radicular radiolucency. Another study by Rosenberg et al showed similar results.<sup>1</sup>

Variable results have been achieved from previous literature regarding whether to do occlusal reduction or not.<sup>5,10,11,12</sup> Stimulation of nociceptors will result in pain on percussion or pain while chewing. By reducing functional and non-functional cusps, sensitization of nociceptors is decreased mechanically which results in pain relief.<sup>13</sup> Reduction of natural tooth structure is also another debatable factor as it is not accepted by many patients but patients should be informed about the need of full coverage occlusal surface in posterior teeth after endodontic treatment.

The results of the present study showed that occlusal reduction is an important factor in reducing post-instrumentation pain in patients with irreversible pulpitis. The reason of the difference in results from previous studies is may be due to difference in patient's demographics, assessment criteria and use of different intracanal medicaments as pain scale used by the previous studies was same VAS.

Limitations of the current study was acceptability of the patient for reducing natural tooth structure. Secondly, rotary endodontics along with single visit root canal treatment is becoming popular now a days. Therefore, there is a need of evaluating the effect of occlusal reduction in such cases.

## CONCLUSION

It is concluded in the present study that occlusal reduction helps in reducing post-instrumentation pain in patients undergoing endodontic treatment of posterior teeth.

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## CONTRIBUTION BY AUTHORS

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| 1 | <b>Hira Zaman:</b>     | Author of the article, statistical analysis |
| 2 | <b>Saad Shahnawaz:</b> | Data collection, final review               |