

Comparison of Post Instrumentation Pain Score in Irreversible Pulpitis with Occlusal Reduction Versus No Occlusal Reduction



Muhammad Talha Khan¹

BDS

Saroosh Ehsan²

BDS, FCPS

Arshad Hasan³

BDS, FCPS

OBJECTIVE: To compare the effect of occlusal reduction on post instrumentation endodontic pain. It is essential in endodontics to control pain during root canal treatment. Several techniques including pre-operative analgesics, corticosteroid preparation, use of anaesthetics and reducing the occlusal surface of tooth can be used for controlling pain in endodontic therapy. The reduction of occlusal surface of tooth is a simple procedure to reduce pain during endodontic therapy.

METHODOLOGY: This quasi experimental study was conducted in department of Operative Dentistry, at Fatima Memorial Hospital, Lahore from September 2017 to March 2018. Total Hundred patients of both genders with irreversible pulpitis in posterior teeth and no to mild tenderness to percussion were chosen by non-probability consecutive sampling. After use of local anesthesia, canal preparation was done, and calcium hydroxide dressing were placed in all canals. All patients were indiscriminately allocated in two groups i.e. Occlusal reduction group (Group A) and Group without occlusal reduction (Group B). Pre-operative pain before start of procedure and post-operative pain 6 days after instrumentation were recorded on visual analogue scale. The final result was mean post instrumentation pain value for both groups recorded at 6 days after instrumentation. Data was evaluated by Independent sample t-test at $p \leq 0.05$ considered as significant.

RESULTS: There was no significant difference in the mean pain scores between the two groups. (Group A 1.2 ± 0.926 , Group B 1.38 ± 1.176 , $p > 0.05$).

CONCLUSION: Occlusal reduction did not influence occurrence of post instrumentation pain in irreversible pulpitis cases.

KEY WORDS: Root canal therapy, Postoperative pain, Reduction of occlusal surface, Irreversible pulpitis, Preoperative pain.

HOW TO CITE: Khan MT, Ehsan S, Hasan A. Comparison of post instrumentation pain score in irreversible pulpitis with occlusal reduction versus no occlusal reduction. J Pak Dent Assoc 2019;28(4):162-165.

DOI: <https://doi.org/10.25301/JPDA.284.162>

Received: 16 July 2019, Accepted: 07 August 2019

INTRODUCTION

Pain of endodontic origin is feared by patient and may present management difficulties for the treating clinician. Endodontic pain may occur before, during or even after the tooth is treated. It is managed accordingly.¹ The reported prevalence of pain during endodontic treatment may vary between 3 and 58%.^{2,3}

The reason of large variations in pain prevalence may be due to many factors. These include age and gender of patients, trauma to pulpal or periradicular tissues by mechanical or chemical way, microbiological factors, instrumentation techniques, percussion sensitivity before root canal therapy and the type of intracanal materials.²⁻⁶

Several techniques are in use for controlling pain in root canal therapy. These include use of analgesics preoperatively

and corticosteroids use, use of anesthetics and reducing the occlusal surface of tooth.^{2,4,6-8,15} Reducing the occlusal surface of tooth is easy procedure to reduce endodontic treatment pain.^{4,16-18}

Several studies have investigated the outcome of reducing the occlusal surface of tooth on pain during root canal therapy.^{2-4,6,9} Zaman H and Ahmed SS reported that mean post instrumentation pain score was significantly less in occlusal reduction group than non-occlusal reduction group.⁹ Similarly a local study by Sheikh et al concluded that mean post instrumentation pain was significantly less after occlusal reduction.⁴

Parirokh et al reported no major difference statistically on postoperative pain with or without occlusal reduction.³ Similarly a local study by Asghar et al concluded no major difference statistically on postoperative pain with or without occlusal reduction.²

It is evident from the discussion of published literature that there is a lack of consensus about the need for routine occlusal reduction after endodontic therapy. Similarly,

1. Senior Demonstrator, Department of operative dentistry, Fatima Memorial Hospital, Lahore.

2. Associate Professor, Department of Operative Dentistry, Fatima Memorial Hospital, Lahore.

3. Professor, Head of Department, Operative Dentistry, Dow Dental College, Karachi

Corresponding author: "Dr. Muhammad Talha Khan" <dr_talhakhan@hotmail.com>

previous studies were limited by the fact that multiple operators treated the patients and this could lead to operator bias. In addition, as mentioned above age can affect the perception of pain. Previous studies recruited patient with wide age ranges. It was therefore, the objective of this study to observe the effect of occlusal reduction on self reported pain perception in patients diagnosed with irreversible pulpitis. Single operator performed all the procedures and age range was strictly monitored.

METHODOLOGY

This quasi experimental study was done in the Operative Dentistry Department of Fatima Memorial Hospital, Lahore from September 2017 to March 2018. An Institutional ethical committee approved the protocol of the study (Letter no FMH-07-IRB644-M).

A sample size of 100 patients was calculated (50 in each group) as follows. We used mean pain scores from a previously reported paper (2.44 ± 0.86^4 in occlusal reduction group vs. 3.24 ± 0.89^4 in no reduction group) Using Openepi online calculator with power of test (80%) and 5% significance level a total sample size of 38 was calculated, which was increased to 100. Thus a total of 100 patients of age range of 25-40 years diagnosed with irreversible pulpitis in posterior teeth were considered for this study. Outdoor patients of both genders were included in this study. The exclusion criteria were teeth associated with periapical radiolucency assessed by periapical x-ray and teeth having serious periodontal disease assessed by periodontal probe. Informed consent were taken from patients before enrolling them in study.

All patients were indiscriminately allocated in two groups i.e. Occlusal reduction group (Group A) and Group without occlusal reduction (Group B). After explaining visual analogue scale, patients preoperative pain was recorded on visual analogue scale before application of local anesthesia. After administration of local anesthesia containing lignocaine (2%) with epinephrine (1:80,000) endodontic access cavity was prepared by round diamond bur (Mani ISO BR-31) in all patients. After taking working length with a periapical radiograph canal preparation was done. Working length of canal was set 1mm less than radiographic apex.

During root canal preparation 2% of sodium hypochlorite was used as an irrigant. Initial root canal preparation was done up to 15 no file (K- file, Mani). After that Gates-Glidden burs (1 and 2 no) was used for coronal flaring. Then, protaper universal manual files (DENTSPLY, Oklahoma, USA) were used to finish canal preparation to a size F1 or F2 as per manufacturer instructions. Calcium hydroxide paste was placed in all prepared canals. Cavit (Cavit, 3M ESPE) was

used to fill access cavity in all patients.

After confirming with articulating paper, 1 mm of occlusal contacts were reduced by flame shape diamond bur (Mani ISO, FO-30-F) in group A. After 6 days of canal preparation patients were recalled to enter their pain rating on visual analogue scale. On the same appointment. Obturation of the prepared canals was performed. All this information along with demographic variables (name, age, address and gender) was recorded in pre designed Performa. All procedures were done by same person to minimize bias.

SPSS (version 20.0) was used for entry and analysis of data. Frequencies and percentages were calculated for gender. Mean and standard deviation were calculated for age, pre-operative and post-instrumentation pain score at 6 days in both groups. To compare mean post-instrumentation pain in both groups, Independent samples t-test was used at $p \leq 0.05$ considered as significant.

RESULTS

Descriptive statistics of the study are provided in Table 1.

The mean pre-operative pain and standard deviation in occlusal reduction group

Table 1: Descriptive Statistics

(Group A) was (2.00 ± 0.00) and in non-occlusal reduction group (Group B) was (1.98 ± 1.41) as presented in Table 2. The mean pain after instrumentation and standard deviation in group

Gender	Frequency	Percentage
Male	25	50 %
Female	25	50 %
Total	50	100 %
Age	Mean (years \pm SD)	
Occlusal Reduction (Group A)	30.10 ± 4.621	
Non occlusal reduction (Group B)	30.98 ± 4.766	
Total	30.54 ± 4.691	

Group of patient		Pre-operative pain	Post-operative pain	P-value (independent sample t test)
Occlusal reduction (Group A)	Mean	2.00	1.20	0.240
	Std.Deviation	0.00	.926	
Non occlusal reduction (Group B)	Mean	1.98	1.38	
	Std.Deviation	1.41	1.176	
Total	Mean	1.99	1.29	
	Std.Deviation	0.10	1.057	

Table 2: Descriptive statistical mean and standard deviation of Pre-operative pain and post-operative pain on VAS in both groups

having reduce occlusal surface (A) was $(1.20 + 0.926)$ and in group having intact occlusal surface (B) was $(1.38 + 1.176)$ ($p = 0.240$) as shown in Table 2.

DISCUSSION

The result of this study revealed that statistically there was no significant effect of reducing the occlusal surface of tooth on self reported pain perception during endodontic treatment in irreversible pulpitis cases. Previous studies showed contradictory results regarding the effect of reducing the occlusal surface of tooth on post instrumentation pain in irreversible pulpitis cases.^{2-4,6,9,10}

Studies by Creech et al¹¹ Parirokh et al³ and Asghar et al² revealed that there was no significant difference in the outcome of pain after instrumentation during endodontic therapy with or without reducing the occlusal surface. The results of the present study also revealed that there was no significant effect of reducing the occlusal surface of tooth on pain during endodontic treatment in irreversible pulpitis cases. The results of Rosenberg et al¹² study revealed that preoperative pain, pulpitis, no periapical radiolucency and percussion sensitivity all had significant influence on post instrumentation pain after root canal therapy. All of these factors were included in the present study except pretreatment pain. Even after including these factors in the study, the results of the present study revealed that statistically there was no significant effect of reducing the occlusal surface of tooth on pain during endodontic treatment in irreversible pulpitis cases. ($P > .05$), Other important variables that can affect the post instrumentation pain are age and gender of patients and instrumentation techniques, trauma to pulpal or periradicular tissues by mechanical or chemical way, microbiological factors, and the type of intracanal medicaments.²⁻⁶

In order to control the effect of age, age group of the sample in the present study was limited from 25 to 40 years of age. In order to control the effect of gender on post instrumentation pain, number of males and females in both groups of present were equal. Step-back technique was used in previous studies for root canal preparation.^{11,12} Crown down technique with manual protaper was used in present study. Crown down technique has been shown to result in less post instrumentation pain due to less extrusion of apical debris.¹³

In order to control other variables i.e. microbiological factors and intra canal medicament, calcium hydroxide was placed in all canals after instrumentation in contrast to previous studies, where no intracanal medicament was used.^{11,12} In the study conducted by Rosenberg et al¹² only posterior teeth were included which is similar to our study.

Occlusal reduction of a tooth is considered acceptable, when patient is ready for full coverage restoration after endodontic treatment. The tooth would then have no function, if the patient is not willing for full-coverage restoration of the tooth after endodontic therapy and the occlusal surface of tooth is reduced to reduce pain after instrumentation. Thus, dentist and patient should know the adverse effects of occlusal reduction before selecting this procedure.³

On the other hand, studies by Sheikh et al⁴, Rosenberg et al¹², Zaman H and Ahmed SS⁹ showed that reduction of occlusal surface helps in the prevention of pain after instrumentation. The results of present study were different from these studies because of different instrumentation techniques, un equal gender distribution in groups, large age groups of sample, no use of intra canal medicaments and treatment done by different operators.

CONCLUSION

Within the limitations of this study following conclusion can be made:

Occlusal reduction does not help in reducing post instrumentation pain for teeth with irreversible pulpitis.

CONFLICT OF INTEREST

None declared

REFERENCES

1. Memon NA, Memon MR, Ali F. Assessment of the interappointment pain by using two different intracanal medicaments. *Pak Oral Dent J* 2013; 33:145-50.
2. Asghar S, Fatima F, Ali A. Occlusal reduction reduces postoperative pain after endodontic instrumentation. *Pak Oral Dent J* 2014;34: 539-42.
3. Parirokh M, Rekabi AR, Ashouri R, Nakhaee N. Effect of Occlusal Reduction on Postoperative Pain in Teeth with Irreversible Pulpitis and Mild Tenderness to Percussion. *J Endod* 2013;39: 1-5. <https://doi.org/10.1016/j.joen.2012.08.008>
4. Sheikh H, Ahmed MA, Jouhar R, Choudhry Z. Comparison of post instrumentation pain in teeth during root canal treatment with or without occlusal reduction. *Pak Oral Dent J* 2015 ;35:699-01.
5. Mathew ST. Post-operative pain in endodontics: A systemic review. *J Dent Oral Hyg* 2015; 7:130-37. <https://doi.org/10.5897/JDOH2015.0168>
6. Dass DA, Sexana DA, Chandak DM, Khatod DK. Treatment Regimen to Prevent Endodontic flare-Ups-A Review. *IOSR-JDMS* 2015;14:85-90.

7. Ahmed Al-Kahtani. Effect of long acting local anesthetic on postoperative pain in teeth with irreversible pulpitis: Randomized clinical trial. Saudi Pharm J 2014;22:39-2.
<https://doi.org/10.1016/j.jsps.2013.01.004>
8. Parirokh M, Yousefi MH, Nakhee N, et al. Efficacy of bupivacaine on post-operative pain for inferior alveolar nerve block anesthesia after single visit root canal treatment in teeth with irreversible pulpitis. J Endod 2012;38:1035-9.
<https://doi.org/10.1016/j.joen.2012.04.012>
9. Zaman H, Ahmed SS. Effect of occlusal reduction on post instrumentation pain in patients with acute irreversible pulpitis. Pak Oral Dent J 2016;36:119-21.
10. Zeidan BM. Evaluation the Effect of Occlusal Reduction on Postoperative Pain in Teeth with Irreversible Pulpitis and Mild Tenderness to Percussion. J Al Rafidain Uni Coll 2016; 38: 128-140.
11. Creech JL, Walton RE, Kaltenbach R. Effect of occlusal relief on endodontic pain. J Am Dent Assoc 1984;109:64-7.
<https://doi.org/10.14219/jada.archive.1984.0294>
12. Rosenberg PA, Babick PJ, Schertzer L, Leung A. The effect of occlusal reduction on pain after endodontic instrumentation. J Endod 1998;24:492-96.
[https://doi.org/10.1016/S0099-2399\(98\)80054-X](https://doi.org/10.1016/S0099-2399(98)80054-X)
13. Al-Omari MA, Dummer PM. Canal blockage and debris extrusion with eight preparation techniques. J Endod 1995;21:154-8.
[https://doi.org/10.1016/S0099-2399\(06\)80443-7](https://doi.org/10.1016/S0099-2399(06)80443-7)
14. Singh RD, Khatter R, Bal RK, Bal CS. Intracanal Medications versus Placebo in Reducing Postoperative Endodontic Pain - A Double-Blind Randomized Clinical Trial. Braz Dent J 2013;24:25-9.
<https://doi.org/10.1590/0103-6440201302039>
15. Ahmed Al-Kahtani. Effect of long acting local anesthetic on postoperative pain in teeth with irreversible pulpitis: Randomized clinical trial. Saudi Pharm J 2014;22:39-2.
<https://doi.org/10.1016/j.jsps.2013.01.004>
16. Wolcott J, Rossman LE, Hasselgren G. Management of endodontic emergencies. In: Hargreaves KM, Cohen S, eds. Pathways of the Pulp, 10th ed. St Louis, MO: Mosby Elsevier;2011:30-2.
<https://doi.org/10.1016/B978-0-323-06489-7.00002-3>
17. Jostes JL, Holland GR. The effect of occlusal reduction after canal preparation on patient comfort. J Endod 1984;10:34-7.
[https://doi.org/10.1016/S0099-2399\(84\)80251-4](https://doi.org/10.1016/S0099-2399(84)80251-4)
18. Antrim DD, Bakland LK, Parker MW. Treatment of endodontic urgent care cases. Dent Clin North Am 1986;30:549-72.
19. Udoye Ch, Aguwa E. Flare - up incidence and related factors in adults. J Dent Oral Hyg 2010;2:19-22.