Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v2022i1.157
*Biol. Clin. Sci. Res. J., Volume, **2022**: 157*
Original Research Article

EFFECT OF OCCLUSAL REDUCTION ON POSTOPERATIVE PAIN IN MULTIPLE VISIT ROOT CANAL TREATMENT

KUMAR K[1*], SARIM S[2], HAMMAD H[3], AHMED M[4], IRFAN F[5], NAFEES H[5]

[1]*Department of Operative Dentistry, Baqai Dental College, Karachi-Pakistan*
[2]*Department of dentistry, Liaquat College of Medicine and Dentistry, Karachi-Pakistan*
[3]*Department of Operative Dentistry, Hamdard University Dental Hospital, Karachi-Pakistan*
[4]*Department of Dental Material, Bhitai Dental and Medical College, Mirpurkhas-Pakistan*
[5]*Department of Operative Dentistry, Hamdard College of Medicine & Dentistry (HCM& D) Hamdard University, Karachi-Pakistan*
**Correspondence author email address: drkelash25@gmail.com*

(Received, 10th June 2022, Revised 9th December 2022, Published 13th December 2022)

Abstract: *The study aimed to assess occlusal reduction's effect on postoperative pain in multiple-visit root canal treatment. This randomized control trial was conducted at the Operative Dentistry & Endodontics Department, Baqai Dental College Karachi, from January 2021 to January 2022. A total of 110 patients fulfilling the inclusion criteria were included in the study. The patient was divided into two groups, Group A, occlusal reduction (OR) and Group B, no occlusal reduction (NOR). In group A, all occlusal contacts on the functional and non-functional cusps and the marginal ridges were reduced by 1 mm by a diamond bur in a high-speed handpiece and confirmed with articulating paper. No occlusal reduction was performed in group B patients. Patients were recalled after 24 hours and 7 days, and their pain level was recorded on VAS; at the same appointment, the root canal was completed, and the tooth was restored permanently. Pain level on the 7th day was taken as the study's primary endpoint. The mean age of patients was 37.41±10.635, with a minimum age of 19 and a maximum of 59 years old. Female patients were 56% and 44%, male. There were two study groups' OR 50% and NOR 50%. The tooth type included were 40% anterior and 60% posterior. Group A patients had reduced pain levels after 24 hours, with a significant difference of P=0.014 compared to group B patients. After 7 days of treatment, no significant difference was found in postoperative pain between both groups with P=0.533. Thus, it can be concluded from the study that the occlusive reduction may not be effective in reducing pain at the 7th postoperative days of multiple visit root canal treatment. Although a significant difference in pain levels was identified after 24 hours of therapy, patients in the occlusion reduction group reported less discomfort than those in the control group.*

Keywords: Occlusion Reduction, Root Canal Treatment, Postoperative Pain, Multiple Visit Protocol

Introduction

The main aim of endodontic treatment is to remove infection and associated pain and prevent periapical disease progression. The primary goal during and after a root canal procedure is to manage dental pain (ElMubarak et al., 2010). There are numerous causes of postoperative endodontic pain, including; preoperative pain, tender to percussion preoperatively, presence of periapical radiolucency, number of visits, method of root canal preparation, the protocol of irrigation and disinfections, age and gender of patients (Parirokh et al., 2013). Modern endodontic techniques and tools, like rubber dam isolation, magnifying glasses, electronic apex locators, and various rotary file systems, not only increase the likelihood that a root canal surgery will be successful but also speed up the process and make it more ergonomic (Parekh and Taluja, 2011; Sathorn et al., 2009). Root canal treatment can be finished in single or multiple visit protocol. It depends on many factors, including preoperative diagnosis, pulp status, dental practice types, and general practitioner or specialist. The most controversial factors are postoperative pain and periapical tissue healing while selecting treatment protocol. Therefore, most practitioners opt for multiple-visit root canal treatment (Carrotte, 2005; Tiwari et al., 2014).

Several modalities have been suggested in the literature to manage pain during and after root canal treatment, including long-acting local anesthesia, the use of analgesics and corticosteroids, procedural methods such as occlusal reduction and intracanal medicaments (Parirokh et al., 2012; Rosenberg,

[Citation: Kumar, K., Sarim, S., Hammad, H., Ahmed, M., Irfan, F., Nafees, H. (2022). Effect of occlusal reduction on postoperative pain in multiple visit root canal treatment. *Biol. Clin. Sci. Res. J.*, **2022***: 157*. doi: https://doi.org/10.54112/bcsrj.v2022i1.157]

2002). The use of intracanal medicaments is every day in multiple-visit therapy. There is a dilemma for the dentist about occlusion reduction and whether to perform or not to reduce postoperative pain. Therefore, this study aimed to assess the effect of occlusal reduction on postoperative pain in multiple-visit root canal treatment.

Methodology

This experimental study was performed in Operative Dentistry & Endodontics Department, Baqai Dental College Karachi, from January 2021 to January 2022. Inclusion criteria were set as healthy patients aged 18 to 60 years, the mandibular and maxillary opposing tooth (or teeth) with normal occlusal contact; cases of irreversible pulpitis require root canal treatment, mild tenderness to percussion. The patients excluded from the study that had unrestorable teeth, grade I Mobile teeth, over-instrumented cases during root canal preparation, patients who had used preoperative antibiotics or analgesics in the last 24 hours of their treatment, and previously endodontically treated cases. The total sample size was 110 (55 in each group), calculated using an Open-Epi sample size calculator by taking a confidence level of 95% and a power of 80. The sampling technique was simply random. After taking the informed consent, a visual analog pain scale (VAS) was explained to the patients and used to evaluate pain levels. The teeth were then anesthetized containing 2% lidocaine with 1:80,000 epinephrine. After access opening with a diamond bur, the working length was established by using an apex locator and confirmed with a periapical radiograph. The working length of each root canal was set at 1mm less than the radiographic apex. Stainless steel file #15 was used for the initial negotiation (K- file, Mani). The cleaning and shaping were perfumed with protaper rotary instruments and, after complete preparation, restored with temporary restorative material (Cavit). The patient was divided into two equal groups, Group A, occlusal reduction (OR) and Group B, no occlusal reduction (NOR), using a simple lottery method. In Group A patients, all occlusal contacts were reduced by 1 mm by using a diamond bur in a high-speed handpiece with copious water spray and occlusal clearance verified with articulating paper. No occlusal reduction was performed in group B patients. Patients were recalled after 24 hours and 7 days, and their pain levels were recorded on VAS. The root canal was completed and permanently restored. Pain level on the 7th day was taken as the study's primary endpoint. An Independent sample t-test was applied to compare the mean post-instrumentation pain in both groups-value. Less than equal to 0.05 was considered significant.

Result

A total of 110 patients were included in the study; 48 (43.6%) were male, and 62 (56.4%) were female. The majority of patients were aged between 19 to 59 years. The mean age of the patient is 37.41± 10.63 years. The primarily posterior tooth was involved in 66%, followed by the anterior tooth in 44% of cases (Figure 1). Preoperative and postoperative pain were recorded after 24 hours and 7 days, as shown in Table 1. The group of study, when compared with effectiveness as measured by recording the postoperative pain after 7 days of treatment, as shown in Table 2, with no significant difference between both groups. The groups of study, when compared to pain levels after 24 hours postoperatively, were found with a significant difference, as shown in Table.3.

Figure 1 Type of tooths

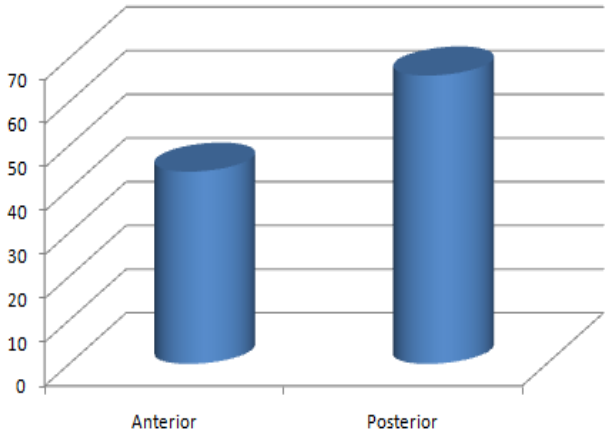

Table 1. Preoperative and postoperative pain

Pain scale	Preoperative pain		Postoperative pain after 24 hours		Postoperative pain after 7 days	
	N	%	N	%	N	%
No Pain	0	0	51	46.4	77	70.0
Mild Pain	13	11.8	45	40.9	33	30.0
Moderate pain	45	40.9	14	12.7	0	0
Severe pain	52	47.3	0	0	0	0
Total	110	100	110	100	110	100

[Citation: Kumar, K., Sarim, S., Hammad, H., Ahmed, M., Irfan, F., Nafees, H. (2022). Effect of occlusal reduction on postoperative pain in multiple visit root canal treatment. *Biol. Clin. Sci. Res. J.*, **2022***: 157*. doi: https://doi.org/10.54112/bcsrj.v2022i1.157]

Table 2. Study group and postoperative pain score after 7 days

Study Group	Postoperative Pain score after 7 days		Total	*P*-value
	No Pain	Mild Pain		
Occlusal Reduction	40	15	55	0.533
No Occlusal Reduction	37	18	55	
Total	77	33	110	

Table 3. Study group and postoperative pain score after 24 hours

Study Group	Postoperative Pain Score after 24 hours			Total	*P*-value
	No Pain	Mild Pain	Moderate Pain		
Occlusal Reduction	20	30	5	55	0.014
No Occlusal Reduction	31	15	9	55	
Total	51	45	14	110	

Discussion

Endodontic flare-up is frequent during and following root canal therapy. Numerous techniques have been used to reduce these complications, including local anesthesia, analgesics, intracanal medicaments and occlusion reduction (Jayakodi et al., 2012). The findings of this study were no significant difference in postoperative pain with or without occlusion reduction conducted during multiple visit root canal treatment in the 40 patients in group A and the 37 patients in group B, which lies in agreement with the study performed by Creech et al. and Vianna et al. (Creech 3rd et al., 1984; Vianna et al., 2020). All teeth that required root canal treatments followed by extra coronal coverage restoration were included in this study, contrary to the previous studies (Kiran et al., 2022; Vianna et al., 2020). Patients with severe and moderate preoperative pain, 47% and 41%, respectively, were part of the study, which became reduced after 24 hours and 7 days up to a non-significant level. Such results are in harmony with the study performed by Ghimire et al. (Ghimire et al. 2020). There was a significant pain reduction after 24 hours of treatment in group A patients with P=0.014 compared to group B patients in whom the occlusal reduction was not performed. This could be because stimulation of periradicular nociceptors occur due to increased inflammatory mediators cause by repeated mastication and chewing, which could not be possible when occlusion surfaces are reduced in Group A patients. This is in agreement with the study of Kiran et al., who suggested occlusal reduction was effective in reducing postoperative pain (Kiran et al., 2022). The extrusion of apical debris is the common cause of postoperative pain. In this study, the working length was maintained to help the apex located and simultaneously by taking multiple radiographs during the procedure, which negated this factor being the cause of pain postoperatively. Pain perception is the subjective experience that may be affected by physical and psychological phenomena. In this study, the pain was assessed subjectively with the help of VAS, which could be the limiting factor in assessing the results.

Conclusion

It was concluded that there is no significant difference in postoperative pain after 7 days between occlusion reduction and no occlusion reduction when performed during multiple visit root canal treatment. Although a significant difference was found in pain levels after 24 hours of treatment, with less pain level recorded in patients of the occlusion reduction group than in the no occlusion reduction group.

Conflict of interest

The authors declare no conflict of interest.

References

Carrotte, P. (2005). 21st century endodontics: part 4. *International dental journal***55**, 334-340.

Creech 3rd, J., Walton, R. E., and Kaltenbach, R. (1984). Effect of occlusal relief on endodontic pain. *Journal of the American Dental Association (1939)***109**, 64-67.

ElMubarak, A. H. H., Abu-bakr, N. H., and Ibrahim, Y. E. (2010). Postoperative pain in multiple-visit and single-visit root canal treatment. *Journal of endodontics***36**, 36-39.

Ghimire, S., Dixit, P. B., Roy, D. K., Dhital, S., and Dahal, S. (2020). Effect of Occlusal Reduction on Postoperative Pain in Teeth with Irreversible Pulpitis and Mild Tenderness to Percussion. *Journal of College of Medical Sciences-Nepal***16**, 17-20.

Jayakodi, H., Kailasam, S., Kumaravadivel, K., Thangavelu, B., and Mathew, S. (2012).

[Citation: Kumar, K., Sarim, S., Hammad, H., Ahmed, M., Irfan, F., Nafees, H. (2022). Effect of occlusal reduction on postoperative pain in multiple visit root canal treatment. *Biol. Clin. Sci. Res. J.*, **2022***: 157*. doi: https://doi.org/10.54112/bcsrj.v2022i1.157]

Clinical and pharmacological management of endodontic flare-up. *Journal of pharmacy & bioallied sciences***4**, S294.

Kiran, A., Chidanadappa, R. N., and Kaur, A. (2022). Pattern of postoperative pain during endodontic treatment–A randomized control study. *Indian Journal of Dental Sciences***14**, 165.

Parekh, V., and Taluja, C. (2011). Comparative study of periapical radiographic techniques with apex locator for endodontic working length estimation: an ex vivo study. *J Contemp Dent Pract***12**, 131-134.

Parirokh, M., Rekabi, A. R., Ashouri, R., Nakhaee, N., Abbott, P. V., and Gorjestani, H. (2013). Effect of occlusal reduction on postoperative pain in teeth with irreversible pulpitis and mild tenderness to percussion. *Journal of endodontics***39**, 1-5.

Parirokh, M., Yosefi, M. H., Nakhaee, N., Manochehrifar, H., Abbott, P. V., and Forghani, F. R. (2012). Effect of bupivacaine on postoperative pain for inferior alveolar nerve block anesthesia after single-visit root canal treatment in teeth with irreversible pulpitis. *Journal of endodontics***38**, 1035-1039.

Rosenberg, P. A. (2002). Clinical strategies for managing endodontic pain. *Endodontic Topics***3**, 78-92.

Sathorn, C., Parashos, P., and Messer, H. (2009). Australian endodontists' perceptions of single and multiple visit root canal treatment. *International endodontic journal***42**, 811-818.

Tiwari, B., Krishnan, M., and Arora, V. (2014). Redefining single visit endodontic protocol. *Indian Journal of Dental Advancements***6**, 1550-1554.

Vianna, E. C. B., Herkrath, F. J., Martins, I. E. B., Lopes, L. P. B., Marques, A. A. F., and Sponchiado Júnior, E. C. (2020). Effect of occlusal adjustment on postoperative pain after root canal treatment: A randomized clinical trial. *Brazilian Dental Journal***31**, 353-359.

[Citation: Kumar, K., Sarim, S., Hammad, H., Ahmed, M., Irfan, F., Nafees, H. (2022). Effect of occlusal reduction on postoperative pain in multiple visit root canal treatment. *Biol. Clin. Sci. Res. J.*, **2022***: 157*. doi: https://doi.org/10.54112/bcsrj.v2022i1.157]