ORIGINAL ARTICLE

EFFECT OF OCCLUSAL REDUCTION ON FREQUENCY OF POST OPERATIVE PAIN RELIEF, FOLLOWING AN ENDODONTIC INSTRUMENTATION

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ABSTRACT

Occlusal reduction has been widely used after root canal treatment to reduce post treatment pain and flare up. The objective of the present study was to compare the effect of occlusal reduction on frequency of post-operative pain relief, following an endodontic instrumentation in patients with irreversible pulpitis. A randomized controlled trial was conducted in the Out patients Department of Operative Dentistry, Islamic International Dental Hospital,Islamabad from August 2015 to January 2016. Hundred adult volunteers presented for endodontic treatment of vital teeth with history of irreversible pulpitis, tenderness to percussion, Moderate to severe pain and fulfilling the inclusion criteria. In the first appointment Biomechanical preparation of the canals were performed and the canals were dressed with calcium hydroxide paste before sealing the access cavity with a temporary restorative material. The patients were randomly divided into two groups, the occlusal reduction (OR) group and the no occlusal reduction (NOR) group with 50 patients in each group. The patients of both groups were instructed to complete the VAS at 24hrs after the procedure to rate their pain as mild, moderate or severe and were asked to bring the Performa along at the next scheduled appointment. All the data collected was entered and analyzed using statistical package for social sciences(SPSS version 10). Chi-square test was used for qualitative variable(frequency of post-operative pain ,gender) and independent sample T-test for quantitative variable(age). Results were statistically not significant (p>0.05) showing there was no effect of occlusal reduction on post-operative pain relief after endodontic instrumentation in patients with irreversible pulpitis.

Key Words: *post-operative, occlusal reduction, root canal treatment, irreversible pulpitis.*

INTRODUCTION

Endodontic instrumentation is a common procedure in dentistry for teeth with irreversible pulpitis. Post-operative pain is defined as pain of any degree that occurs after the initiation of endodontic therapy.[1] Numerous studies evaluating frequency of post-operative pain following endodontic treatment have been published with highly variable reported range from 82.9% to 10.6%.[1-4]

This vast difference of frequency of post- operative pain are due to a number of factors which may be related to patient (age, gender, medical history), or related to concerned tooth (tooth type, history of pre-operative pain, periapical status, tenderness to percussion), or related to operator instrumentation technique (number of visits given, intra-canal medicaments given or not, kind of irrigation used).[2,3]

A number of different strategies have been used for managing post-operative pain after endodontic instrumentation most commonly of which are pre-operative analgesic and steroid prescription[4],or administration of long acting anesthesia[5], and occlusal reduction.[2]

Several investigators have evaluated the effect of occlusal reduction on post-operative pain after endodontic instrumentation.[2,6-9] The results of these varied

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Received for Publication: August 31, 2016
Revised: September 30, 2016
Accepted: October 1, 2016

from positive concluded study showing that occlusal reduction did had an effect on reducing post-operative pain (only 27.7% patients in occlusal reduction group patients experienced post-operative pain after endodontic instrumentation as compared to 56.5% patients in no occlusal reduction group).[2] This was in contrast to other study which concluded that occlusal reduction did not had any effect in reducing frequency of post-operative pain (52.06% patients in occlusal reduction group and 47.94% patients in no occlusal reduction group experienced no pain after endodontic instrumentation).[6]

The varied results of different studies creates a dilemma for dentists regarding whether they should reduce occlusal contacts or not following an endodontic instrumentation to reduce the frequency of postoperative pain as pain is considered as a benchmark against which clinician skill are measured and can undermine patients confidence in their dentist or patients satisfaction with their treatment. Hence the present study was aimed to determine if occlusal reduction of tooth after an endodontic instrumentation will help in reducing post-operative pain or not.

METHODOLOGY

An approval for this study was obtained from the ethical committee of the Islamic International Dental Hospital (IIDH).One Hundred Patients fulfilling the inclusion criteria and aged between 18-60 years from both genders were selected randomly from the Operative Department OPD to participate in this study. Included in the study were posterior maxillary and mandibular teeth with irreversible pulpitis having history of moderate to severe pain (VAS 4-10), tender to percussion and with normal periapical radiographic appearance. Excluded from the study were patients younger than 18 years age, teeth without opposing teeth and without occlusal contacts, presence of any systemic disease that prevented administration of lidocaine as the anesthetic agent and teeth with an infected pulp with swelling and sinus tract.

A visual analogue scale (VAS) was used to evaluate preoperative pain levels and only the patient with moderate to severe pain (VAS 4-10) were included in present study. Patients were instructed to complete the VAS before local anesthesia was administered.

The teeth were then anesthetized by using 2 cartridges of local anesthetic solution containing 2% lidocaine with 1:80,000 epinephrine (dentsply). All endodontic treatment was performed by a single operator in two appointments. In the first appointment Biomechanical preparation of the canals was performed after establishment of the working length by using an apex locator and confirming the measurements with a periapical radiograph. The canals were instrumented initially to file size No. 20, followed by gates-glidden bur sizes 1 and 2 to prepare the coronal portion of canal. A 1.3% solution of sodium hypochlorite was used as an irrigant between each instrumentation. After the biomechanical preparation, the root canals were dressed with Calcium Hydroxide (CaOH) paste and the access cavity was sealed with a temporary restorative material.

The patients were randomly divided into two groups, the occlusal reduction (OR) group and the no occlusal reduction (NOR) group with 50 patients in each group. After confirming the presence of occlusal contacts with articulating paper, patients in the OR group had all the occlusal contacts on cusps and marginal ridges reduced by 1mm, using a diamond bur in a high speed hand piece with copious water spray. Occlusal reduction was not done in the NOR group.

The patients of both groups were instructed to complete the VAS at 24hrs after the procedure to rate their pain as mild, moderate or severe and were asked to bring the performa along at the next scheduled appointment. No analgesic was prescribed to the patient. All the data collected was entered and analyzed using statistical package for social sciences (SPSS version 10). Descriptive statistics were used to calculate qualitative and quantitative variables. Chi-square test was used for qualitative variable (frequency of post-operative pain, gender) and independent sample T-test for quantitative variable (age). P-value < 0.05 was considered significant.

RESULTS

One hundred subjects participated in present study. The participants aged between 18-60 years as a whole in both genders. Out of 100 patients 24(24%) patients were in range of age group 18-28 years, 33 (33%) patients were between age group 29-39 years, 22 (22%) were in between age group 40-50 years and 21 (21%) were in between age group 51-60 years. The mean age of the participants was 36.8±11.0 (Table 1).

TABLE 1: AGE GROUP, FREQUENCY DISTRIBUTION AND RESPECTIVE PERCENTAGES

Age	Frequency (%)
18-28	24(24%)
29-39	33(33%)
40-50	22(22%)
50-60	21(21%)
Total	100
Mean Age	36.8 years + 11years

TABLE 2: COMPARISON OF FREQUENCY OF PAIN RELEIF IN OR AND NOR GROUP IN DIFFERENT AGE GROUPS

Age groups (years)	No Occlusal Reduction (NOR)		Occlusal Reduction (OR)	
	Pain Relief n (%)	No pain relief n (%)	Pain relief n (%)	No pain relief n (%)
18-28	8(80%)	2(20%)	12(85.75%)	2(14.2%)
29-39	18(94.7%)	1(5.2%)	13(92.8%)	1(7.1%)
40-50	8(88.8%)	1(11.1%)	13(100%)	0(0%)
50-60	11(91.6%)	1(8.3%)	9(100%)	0(0%)
P-value	0.652 (>0.05)		0.370 (>0.05)	

TABLE 3: COMPARISON OF FREQUENCY OF PAIN RELIEF IN OR AND NOR GROUP IN BOTH GENDERS

Gender	No Occlusal Reduction (NOR)		Occlusal Reduction (OR)	
	Pain Relief n (%)	No pain relief n (%)	Pain relief n (%)	No pain relief n (%)
Male	16(100%)	0(0%)	17(100%)	0(0%)
Female	29(85.2%)	5(14.7%)	30(90.9%)	3(9.0%)
P-value	0.106 (>0.05)		0.2 (>0.05)	

TABLE 4: COMPARISON OF FREQUENCY OF POST OPERATIVE PAIN RELIEF BETWEEN NOR AND OR GROUPS (CHI SQUARE)

	Pain releif	No pain releif	Total
No occlusal reduction (NOR)	45	5	50
Occlusal reduction (OR)	47	3	50
Total	92	8	100
P Value	0.461 (>0.05)		

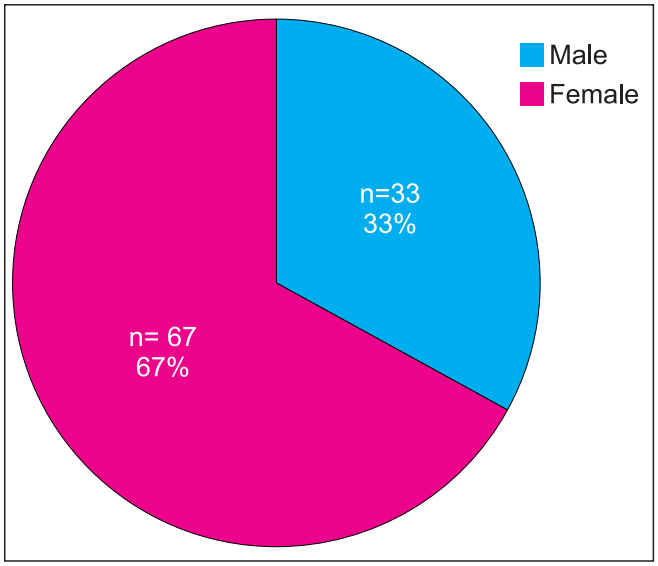

Fig 1: Gender distribution of the participants

For 100 participants of both group (occlusal reduction and no occlusion reduction), the following results were obtained with respect to age group (Table 2). Chi square test was used to compare the significance of different age groups in frequency of pain relief in both occlusal reduction and no occlusal reduction group. The result showed p value >0.05. Hence, there was statistically no significant difference in frequency of pain relief in any age group by both the occlusal reduction and no occlusal reduction (Table 2).

Out of 100 participants 67 were female and 33 were males. Chi square test was used to compare the significance of gender in frequency of pain relief in both the occlusal reduction and no occlusal reduction group. The result showed p value >0.05 in both groups. Hence, there was statistically no significant difference of gender on frequency of pain relief in both the groups (Table 3).

Out of 50 patients who received no occlusal reduction post endodontic instrumentation, 45 patients experience relief of pain after 24 hours and 5 patients reported no pain relief. While out of 50 patients who received occlusal reduction, 47 patients reported pain relief and 3 patients reported no pain relief after 24 hours (Table 4). Chi square test was used to compare the two groups for significance. The result showed p value >0.05. Hence, there was statistically no significant difference between two groups (Table 4).

DISCUSSION

Postoperative pain following endodontic treatment, continues to be a frequently observed, detrimental sequel. The main goal of endodontic procedure is to provide relief of pain to the patient and make the tooth functional. Several methods are used to relieve this post instrumentation pain including medications pre and postoperatively, steroids prescription, local acting anesthesia administration, and occlusal reduction at first visit of endodontic treatment.[2,4]

This study was done to evaluate the effect of occlusal reduction on postoperative pain relief in patients with irreversible pulpitis and the results of the present study have shown that occlusal reduction has no significant effect on postoperative pain relief after root canal instrumentation of teeth with irreversible pulpitis.

Many previous studies like by Parirokh et al[6], Creech et al[7] and Asghar et al[3] had result similar to the present study and revealed no significant difference in the occurrence of post instrumentation pain during endodontic treatment with or without occlusal tooth reduction. In contrary to these studies by Sheikh et al[8] and Rosenberg et al[9] showed that occlusal reduction helps in the prevention of post instrumentation pain in teeth with irreversible pulpitis. Such difference is probably because of multiple factors that will affect the treatment that includes patient related factors and clinician related factors.[1,2] Patient related factors include difficulty in pain threshold, patients demographics like age, gender, health status 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.[1-5,10-12]

Few previous studies[7,8,10] have depicted that Periapical allodynia and presence of periapical periodontitis are significant predictors for pain after root canal treatment and have more effect than preoperative pain and mild tenderness to percussion on the efficacy of occlusal reduction in postoperative pain relief. This might be the reason of the difference in results from previous studies[7,8,10] as the tooth included in the present study had no periapical periodontitis.

One of the confounding factors in the present study was that, all the teeth included in both the occlusal reduction and non occlusal reduction groups had Calcium Hydroxide placed as an intracanal medicament between first and second appointment, this was in difference to earlier studies of the effect of occlusal reduction where the root canals were left empty without any Intra-canal medicament.[7,9] There are various studies done regarding the efficacy of Calcium Hydroxide in reducing postoperative pain when used as a root canal medicament and have reported favorable results.[11,12] So one of the significant factors that have played a role in reducing postoperative pain in the present study might be due to the effect of calcium hydroxide as intra-canal medicament during appointments. A limitation of the present study was that if the tooth having its occlusal surfaces reduced is not covered by a full coverage restoration, the tooth would then be out of occlusion and nonfunctional.

CONCLUSION

In the present study no significant effect of the occlusal reduction on post-operative pain relief after endodontic instrumentation was noticed.

REFERENCES

1 ElMubarak AH, Abu-bakr NH, Ibrahim YE. Postoperative pain in multiple-visit and single-visit root canal treatment. J Endod 2013; 36: 36-39.

2 Arias A, de la Macorra JC, Hidalgo JJ, Azabal M. Predictive models of pain following root canal treatment: a prospective clinical study. Int Endod J 2013; 46: 784-93.

3 Asghar S, Fatima F, Ali A. Occlusal reduction reduces postoperative pain after endodontic instrumentation. Pak Oral Dental J 2014; 34: 539-42.

4 Jalalzadeh SM, Mamavi A, Shahriari S, Santos FA, Pochapski MT. Effect of pretreatment prednisolone on postendodontic pain: a double-blind parallel-randomized clinical trial. J Endod 2010; 36: 978-81.

5 Parirokh M, Yosefi MH, Nakhaee N, Manochehrifar H, Abbott PV, Forghani FR. Effect of bupivacaine on postoperative pain for inferior alveolar nerve block anesthesia after single-visit root canal treatment in teeth with irreversible pulpitis. J Endod 2012; 38: 1035-39.

6 Parirokh M, Rekabi AR, Ashouri R, Nakhaee N, Abbott PV, Gorjestani H. Effect of occlusal reduction on postoperative pain in teeth with irreversible pulpitis and mild tenderness to percussion. J Endod 2013; 39: 1-5.

7 Creech JL 3rd, Walton RE, Kaltenbach R. Effect of occlusal relief on endodontic pain. J Am Dent Assoc 1984; 109: 64-67.

8 Sheikh H, Ahmed A, Jouhar R, Chauhdary Z. Comparison of post instrumentation pain in teeth during root canal treatment with or without occlusal reduction. PODJ. 2015; 35(4): 699-701.

9 Rosenberg PA, Babick PJ, Schertzer L, Leung A. The effect of occlusal reduction on pain after endodontic instrumentation. J Endod 1998; 24: 492-96.

10 Gatewood RS, Himel VT, Dorn SO. Treatment of the endodontic emergency: a decade later. J Endod 1990: 16: 284-91.

11 Memon NA, Memon MR, Ali F. Assesment of inter appointment pain by using two different intracanal medicaments. PODJ. 2013; 33(1): 145-50.

12 Ghoddusi J, Javidi M, Zarrabi MH, Bagheri H. Flare-ups incidence and severity after using calcium hydroxide as intracanal dressing. N Y State Dent J 2006; 72: 24-28.

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1 Iffat Raza:	Main author, designed the work, collected data, statistical analysis and interpretation of the data was done, wrote the article
2 Alia Ahmed:	Statistical analysis, Final approval of the version to be published
3 Numra Khalid:	Reviewed the article
4 Farwa Batool:	Helped in data collection