ORIGINAL ARTICLE

COMPARISON OF POST INSTRUMENTATION PAIN IN TEETH DURING ROOT CANAL TREATMENT WITH OR WITH OUT OCCLUSAL REDUCTION

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ABSTRACT

The objective of the study was to compare the post instrumentation pain in teeth undergoing root canal treatment with or without occlusal tooth reduction.

This randomized control trial was conducted at Outpatient Department of Operative Dentistry at Altamash Institute of Dental Medicine from September 2011 to March 2014. A total of 402 patients with irreversible pulpitis and normal periapical radiographic appearance of posterior teeth were included in this study.

Patients were randomly allocated into two groups i.e occlusal tooth reduction (OTR) group and no occlusal tooth reduction (NOTR) group. After root canal instrumentation, patients were instructed to complete a Visual Analogue Scale (VAS) to score their pain at 6 hours, 12 hours, 18 hours, 24 hours, 2 days, 3 days, 4 days, 5 days, and 6 days. The final outcome that is mean post instrumentation pain score was measured at 6 days of post instrumentation.

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Mean post instrumentation pain score at 6 days was significantly low in OTR group than NOTR groups (2.44±0.86 vs. 3.24±0.89; p=0.0005). Thus, it is concluded that occlusal reduc¬tion help in the prevention of post instrumentation pain in teeth with irreversible pulpitis, sensitivity to purcussion, pre- treatment pain and absence of per¬iradicular radiolucency. Whereas the presence of all four conditions are the strong predictors, the presence of any one or more of the conditions is enough to indicate a need for occlusal reduction.

Key Words: *Root canal treatment, Post instrumentation pain, Occlusal reduction, Irreversible pulpitis, Pre treatment pain.*

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INTRODUCTION

Post instrumentation pain during endodontic procedure is detrimental occurrence for both patients and clinicians.[1] Despite advances in endodontic therapy, studies have shown that pain frequency and intensity varies between multiple visits during root canal treatment. Microorganisms are usually regarded as the most common cause of post instrumentation pain as there is a clear indication of interactions between periapical tissues and microorganisms.[2] Other factors that may affect the progression of post instrumentation pain during endodontic treatment includes history of preoperative pain, the need for re-treatment and mechanical or chemical injury to pulpal or periradicular tissues.[3]

Several strategies have been described for managing pain and discomfort between multiple visits during root canal treatment.[4] These includes pre-treatment analgesics and steroids administration, occlusal reduction and giving long acting local anesthesia.[5] Occlusal reduction is simple procedure utilized to minimize post instrumentation discomfort by reducing the occlusion on the tooth under treatment.[6] Sensitivity to purcussion or pain on biting is due to stimulation of nociceptors at its peripheral terminal. Occlusal adjustment decreases mechanical stimulation of sensitized nociceptors.[7]

Ambivalent results have been described by numerous studies[8,9] for the effectiveness of occlusal reduction on post instrumentation pain during endodontic treatment and this creates a confusion for operator about whether they should perform occlusal reduction in every tooth in order to prevent pain during root canal treatment or vice versa. Therefore it is worthwhile to conduct study that can evaluate the effect of occlusal reduction on post instrumentation pain during root canal treatment.

The objective of present study was to compare the post instrumentation pain in teeth during root canal treatment with or with out occlusal tooth reduction and it was hypothesized that there is no difference in post instrumentation pain in teeth undergoing root canal treatment with or without occlusal tooth reduction.

METHODOLOGY

This randomized controlled trial was conducted in the outpatient department of Operative Dentistry at Altamash Institute of Dental Medicine from September 2011 to March 2014. The sample size was calculated to be 402 by using WHO recommended sample size determination software and by considering the reference article.[10] Informed verbal consent were taken from each patient and those who refused to give consent, were excluded from the study. The inclusion criteria were; posterior teeth, patients between 16 to 70 years of age presented with irreversible pulpitis and normal periapical radiographic appearance of posterior teeth, existance of an opposing teeth with normal occlusion with out restoration. The exclusion criteria were, presence of a periapical radiolucency, teeth not suitable for restoration, teeth with previously failed root canal treatment, severe periodontally compromised teeth and any teeth where the working length has been over-estimated or where instruments have inadvertently been placed beyond the working length. All root canal treatment were performed under supervision of Consultants. After access opening with a tapered fissure and/or round diamond bur (Mani ISO TF-13 and/or ISO BR-31) working length were established by using an apex locator (Root ZX; Morita Corporation, Kyoto, Japan) and confirm measurements with a periapical radiograph. The working length of each root canal was set at 1mm less than the radiographic apex. Sodium hypochlorite (3%) was used to irrigate root canal between each instrumentation. The root canals were initially negotiated by # 15 (K- file, Mani), followed by coronal preparation with Gates-Glidden burs (# 2 and # 3). Then, Protaper rotary instruments were used to finish canal preparation to a size F1 or F2 files used at the working length.

After the chemomechanical preparation, calcium hydroxide paste were used as an intra canal medicament and the access cavity were restored with a temporary restorative material (Cavit, 3M ESPE). The patients were randomly divided into two groups of 201 in each by lottery method, the occlusal tooth reduction (OTR) group and the no occlusal tooth reduction (NOTR) group, with the latter serving as a control group. After confirmation of occlusal contacts by articulating paper, 1 mm of occlusal reduction were performed in occlusal tooth reduction group (OTR) by using a flame shaped diamond bur (Mani ISO, FO-30-F) in a high-speed handpiece. To ensure that the patients in the control (NOTR) group was unaware whether their teeth had been reduced, a high-speed handpiece with abundant water was activated inside the patient's mouth without contacting the occlusal surface to simulate the procedure use in the OTR group. Patients were instructed to complete a visual analogue scale to score (0-1-2-3-4-5-6-7-8-9-10) their pain at 6 hours, 12 hours, 18 hours, 24 hours, 2 days, 3 days, 4 days, 5 days, and 6 days after the treatment. The final outcome that is mean post instrumentation pain score was measured at 6 days of post instrumentation followed by obturation.

Independent sample t-test was applied to compare the mean post instrumentation pain in both groups. P-value less than equal to 0.05 was considered as significant.

RESULTS

The result of present study showed that Mean post instrumentation pain score at 6 days was significantly low in OTR group than NOTR groups (2.44±0.86 vs. 3.24±0.89; p=0.0005) as presented in Table 1. Thus, null hypothesis is rejected.

TABLE 1: COMPARISON OF MEAN POST INSTRUMENTATION PAIN SCORE BETWEEN GROUPS

Post Instrumentation pain	NOTR Group n=201	OTR Group n=201	P-Value
Mean ± SD	3.24 ± 0.89	2.44 ± 0.86	0.0005

T-value =9.12; mean difference =0.801 SD=0.088

DISCUSSION

Several studies have assessed the effects of occlusal reduction on post instrumentation pain during endodontic treatment. Rosenberg et al.[10] described in his study the positive effect of occlusal reduction on post instrumentation pain, but Creech et al.[11] and Holland et al.[12] reported no significant differences in post instrumentation pain in patients who had received root canal treatment with or without occlusal reduction. In addition, a local study conducted by Asghar et al.[9] also

prolcaimed no significant difference in the occurance of post instrumentation pain during endodontic treatment with or without occlusal tooth reduction. Asghar et al. contrary results may be due to difference in exclusion criteria and small sample size.

Recent systematic review reported that the prevalence of post instrumentation pain in root canal treatment is between 3% to 58% of patients.[13] The reasons of these large variation among the different studies may be due the differences in assessment criteria, rotary or manual root canal preparation techniques, presence of pre-treatment pain and purcussion sensitivity, usage of different intracanal medicament and variation in demographics such as age and gender.

Another important consideration that may effect the occurance of post instrumentation pain is the quantitiy of apical debris extrution during instrumentation and the type of intra canal medicament. The quantity of apical debris extrusion is difficult to measure clinically on patients whereas, effectiveness of different intracanal medicaments in reducing post instrumentation pain were assessed by different studies.[14,15] However, some studies have found positive results[16,17] while others described statisticallty no significant difference in post instrumentation pain with or without intra canal medicaments.[18,19]

The current study has limitations, as it involves reduction of natural tooth structure which is not always acceptible to patient. Secondly, patients has been treated by multiple operators so inter-operator reliability is questionable. Nowadays trend has been shifted to single visit root canal treatment and in present study root canal treatment were performed in multiple visits, so there is a need for evaluation of the effect of occlusal reduction in single visit root canal treatment.

CONCLUSION

It is concluded that occlusal reduction help in the prevention of post instrumentation pain in teeth with irreversible pulpitis, sensitivity to purcussion, pre-treatment pain and absence of per-iradicular radiolucency. Whereas the presence of all four conditions are the strong predictors, the presence of any one or more of the conditions is enough to indicate a need for occlusal reduction.

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