INCIDENCE OF POST-OPERATIVE PAIN IN TEETH WITH SYMPTOMATIC IRREVERSIBLE PULPITIS WITH AND WITHOUT OCCLUSAL REDUCTION

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ABSTRACT

Objective: *To compare the incidence of post-operative pain in teeth with symptomatic irreversible pulpitis with and without occlusal reduction.*

Materials and Methods: *This randomized controlled trial was done in the Department of Operative Dentistry Armed Forces Institute of Dentistry (AFID) Rawalpindi from 1st June 2019 to 31st December 2019. A total of 262 patients from 20-50 years of age from both gender presenting with symptomatic irreversible pulpitis in their mandibular 1st Molar were randomly divided into two equal groups of 131 patients with the help of scientific random number table. Endodontic therapy was initiated under rubber dam, following pulpectomy and disinfection with frequent irrigation canals were prepared, intra-canal dressing was placed and the cavity was restored with cavit after which a 2mm occlusal reduction was performed for teeth included in group A and no occlusal reduction was done for Group B. Post-operative pain was recorded at 24 hours, 48 hours and 72 hours using the visual analogue scale. Data was analyzed using SPSS 21.*

Results: *There was no statistical difference in the post-operative pain between the two groups.*

Conclusion: *Occlusal reduction has no significant impact on post-operative pain in teeth with irreversible pulpitis.*

Keywords: *Irreversible pulpitis, Occlusal reduction, Post-operative pain*

INTRODUCTION

Post-operative pain presents an unpleasant situation for the patient as well as the dentist.[1] Patients might even consider post-operative pain as a bench mark against which the clinician skills are measured. Post-operative pain is usually caused by acute exacerbation of peri-radicular tissue during non-surgical root canal treatment leading to inter-appointment pain and an unscheduled emergency visit to the dentist.[1] This could be because of a number of causes which include over instrumentation during canal preparation which pushes the debris into the peri-radicular area traumatizing the peri-radicular structures, incomplete removal of necrotic pulp tissue, over extension of intra-canal medicaments and root canal fillings, chemical irritants, hyper-occlusion and root fractures.[2,3] The incidence of post-operative pain is low in patients with a vital pulp without any peri-radicular pathosis and is highest in patients who present with severe pre-operative pain and swelling particularly with a necrotic pulp and peri-radicular pathosis.[4]

The prevalence of pain after initiation of root canal treatment has been reported to be between 3% and 58%.[5] Several treatment approaches have been advocated to reduce the incidence of post-operative pain including administration of pre-operative medications including analgesics and corticosteroids,[6] Using long acting anesthetic solutions, administering post-operative analgesics and corticosteroids,

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placing different intra-canal medicaments[7] and using irrigants,[8] occlusal reduction, using low level laser,[9] preparing a glide path and instrumentation techniques and using cold lateral compaction technique. Occlusal reduction of the tooth after cleaning and shaping of the root canals has been advocated for reducing incidence of post-operative pain or percussion between appointments.[10] It has been proposed that reducing occlusal contacts presumably decreases the pressure on the nociceptors present in the periodontal ligament; this relieves pressure on the injured and inflamed peri-radicular tissues thus reducing the post-operative pain incidence.[11]

However there has been conflicting reports on the incidence of post-operative pain after occlusal reduction. A study by Emara et al evaluated the intensity of post-operative pain after occlusal reduction and concluded that disoccluding the tooth after instrumentation did relieve post-operative pain in cases of both symptomatic irreversible pulpitits and symptomatic apical periodontitis but only at 12 hours after initiation of the endodontic therapy.[12] On the other hand another study conducted by Hakan et al[13] evaluated the effects of occlusal reduction in teeth with symptomatic apical periodontitis and concluded that there was no significant difference in the incidence of post-operative pain in teeth with occlusal reduction. Reducing occlusal contacts in not a norm in our daily clinical practice and there are many conflicting studies as mentioned above. Therefore the purpose of this study was to compare the incidence of post-operative in teeth with symptomatic irreversible pulpitis with and without occlusal reduction in the patients reporting to Armed Forces Institute of Dentistry, Rawalpindi.

MATERIALS AND METHODS

After taking approval from the ethical committee, a prospective study was done at operative department in Armed Forces Institute of Dentistry, Rawalpindi from 01 June to 31 December 2019. A total of 262 patients from 20-50 years of age from both gender with good general health were selected for this study and were randomly divided into two equal groups of 131 patients with the help of scientific random number table. The sample size was calculated by using WHO calculator using the proportions taken from this article.[14] Keeping the power of test at 80% and level of significance at 95%; following population proportions were used:

Population proportion A= 20%

Population proportion B= 8%

The mandibular 1st molars with symptomatic irreversible pulpitis with or without acute apical periodontitis without swelling or any draining sinus were selected for this study. Patients on preoperative analgesics and antibiotics, teeth with calcified canals and previously root canal treated teeth along with patients on chemotherapy, radiotherapy, having weak immune system and pregnant and lactating mothers were all excluded from this study.

The patients reporting to the Operative Dentistry Department of Armed Forces Institute of Dentistry, Rawalpindi requiring root canals of their mandibular 1st molars were screened for inclusion by taking history, performing relevant clinical examination and necessary investigations along with peri-apical radiographs. After diagnosis and selection, the procedure was explained to the patient and root canal treatment was initiated under local anesthesia after rubber dam isolation. Working length was established with apex locator 1 mm short from the radiographic apex and was confirmed with a peri-apical radiograph. The apical portion of canal was enlarged using K-files to size 3-4 files larger than the initial apical file used, and the rest of the canal was prepared using step-back technique with recapitulation with a smaller file. The canals were irrigated copiously with 2.5% sodium hypochlorite in between the successive files and the final irrigation was done with normal saline. Following pulp extirpation, instrumentation and irrigation, canals were thoroughly dried using paper points of appropriate sizes and calcium hydroxide was placed as an intra-canal dressing and the teeth were restored with a temporary filling material.

A total of 262 were divided into two groups:

Group A in which teeth will undergo occlusal reduction of 2mm.

Group B in which teeth will not be occlusally reduced.

After confirming the opposing contacts of the teeth with an articulating paper, 2mm of the occlusal contacts of the teeth from the patients of group A, were reduced using a flame shape diamond bur. At the end of the first appointment, the patient was given

a visual analogue scale (VAS) and was advised to mark at the scale according to his pain intensity after 24, 48 and 72 hours. It is a 10cm horizontal line with zero at one end which denotes 'no pain' and 10 on the other end which denotes 'unbearable pain'. The patient was asked to bring these reading with him on the next scheduled visit.

Data was analyzed using SPSS 21. Frequencies and percentages were presented for qualitative variable like pain and quantitative variable like age, while mean was calculated for age and gender. VAS score 0 was considered as having no pain response. VAS scores from 1-3 was considered a mild painful response, 4-7 was considered a moderately painful response and 8-10 was considered a severely painful response. Chi-Square test was used to compare post-operative endodontic pain for group A and group B after 24 hours, 48 hours and after 72 hours. P value of less than 0.05 was considered as statistically significant.

RESULTS

Comparison of the two groups was made for the baseline characteristics. Mean age of group A was 31.68 ± 6.5 years and group B was 30.51 ± 7.4 years (p=0.327). There were equal number of males and females in both groups. There were 75 (57.25%) females and 56 (42.74%) males in each treatment group (p=1.000). At baseline all the patients reported with severe pain immediately after the treatment. After 24 hours, 48 hours and 72 hours, pain was reduced in both the groups but the study failed to yield any significant results. Both groups had reduced pain levels after instrumentation and pulp extirpation compared to the initial presentation but the difference between the two groups was not statistically significant as p values were more than 0.05 and thus our study revealed that occlusal reduction has no significant impact on the incidence of post-operative pain reduction in teeth presenting with symptomatic irreversible pulpitis.

DISCUSSION

The results of this study have showed that statistically there was no significant reduction in the incidence of post-operative in teeth with asymptomatic irreversible pulpitis. Another study by Raza et al[5] concluded that there was no significant effect of occlusal reduction of teeth on post-operative pain. Similarly the study by Khan et al[15] also concluded that there was no significant difference in the pain score with and without occlusion reduction. Likewise another study by Parirokh et al[16] concluded that there was no significant relief in pain with and without occlusal reduction. All of these studies coincide with our results that occlusal reduction has no significant

Table: 1 showing frequency, percentages and p value of post-operative pain of group A and group B after 24 hours, 48 hours and 72 hours.

Pain	Group A (n=131) With Occlusal Reduction	Group B (n=131) No Occlusal Reduction	p Value
After 24 hours			
No Pain	20 (15.26%)	25 (19.08%)	0.84
Mild Pain	79 (60.30%)	75 (57.25%)	
Moderate Pain	24 (18.32%)	22 (16.79%)	
Severe Pain	8 (6.10%)	9 (6.87%)	
After 48 hours			
No Pain	25 (19.1%)	30 (22.90%)	0.85
Mild Pain	85 (64.88%)	81 (61.83%)	
Moderate Pain	17 (12.97%)	15 (11.45%)	
Severe Pain	4 (3.05%)	5 (3.81%)	
After 72 hours			
No Pain	27 (20.61%)	34 (25.95%)	0.75
Mild Pain	89 (67.93%)	83 (63.35%)	
Moderate Pain	12 (9.16%)	12 (9.16%)	
Severe Pain	3 (2.29%)	2 (1.52%)	

Table: 2 showing percentages and frequency of different age groups in group A and group B

Variable	Group A		Group B	
Age	Frequency	Percentage	Frequency	Percentage
20-30	70	53.43%	66	50.38%
31-40	28	21.37%	38	29%
41-50	33	25.2%	27	20.61%
p value	0.327			

impact on the pain status after endodontic therapy.

On the other hand there have been some conflicting studies on this matter. A study by Rosenberg et al[14] concluded that patients presenting with pre-operative pain, exhibiting vital pulp, sensitivity to percussion and absence of any peri-radicular radiolucency can all benefit from occlusal reduction. This contradicts out study in which teeth with symptomatic irreversible pulpitis did not show any significant pain relief after occlusal reduction when compared with teeth that were not occlusally reduced. Another study conducted on managing the post-operative pain by eliminating occlusal contacts concluded that occlusal reduction did reduce pain status in patient after endodontic therapy.[17] Likewise other studies also concluded that occlusal reduction reduces pain levels in teeth with irreversible pulpitis and symptomatic apical periodontitis.[18,19] These studies are in conflict to our studies which shows that occlusal reduction has no significant impact on post-operative pain reduction in teeth with symptomatic irreversible pulpitis.

Another important consideration that could affect the occurrence of post instrumentation pain is the quantity of apical debris extrusion during cleaning and instrumentation and also the type of intra canal medicament. The quantity of apical debris extrusion is not easy to measure clinically on patients whereas, effectiveness of different intracanal medicaments in reducing post-operative pain were assessed by many studies.[20]

The presented study included patients from 20 to 50 years of age to control the effect of age. Likewise patients from both genders were chosen to dismiss any bias. To control the microbiological impact on post-operative pain calcium hydroxide was used as an intra-canal medicament in both groups. Mandibular 1st molar was chosen to compare the results with other studies because they come in occlusion with the teeth from the opposing arch. Occlusal reduction of 2mm is acceptable as long as the final treatment plan includes a full coverage crown after completion of endodontic therapy otherwise reducing occlusal contacts of molars would result in their loss of function of mastication. Therefore the clinicians and patients need to be made aware of the possible disadvantages of the treatment and the complete treatment plan should be discussed with them beforehand. One of the limitation of this study was that the data was collected using the visual analogue scale. Anxiety and previous experiences with the dentist could also be important factors influencing the patient's response to the treatment and incidence of post-operative pain.[21,22] Pain is a subjective response and it also depends on psychological and emotional state of the patient.[1] Also every patient can have a different threshold for pain and because the data collection relied on the patient's motivation and recall there could be some bias in the data collected.

CONCLUSION

It is concluded that occlusal reduction has no significant impact on the incidence of post-operative pain in teeth with symptomatic irreversible pulpitis.

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