

Comparative Evaluation of Incidence of Postoperative Pain in Single and Multiple Visit Root Canal Therapies: An Original Research Study

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ABSTRACT

Background: This randomized controlled clinical trial-based study was performed to comprehensively evaluate the incidence of postoperative pain in single and multiple visit root canal treatments.

Materials & Methods: In this study, a total of 50 patients (males 32 and females 18) were studied and evaluated for their responses. Only maxillary central incisors were selected in the study. All patients were divided into two major groups of 25 each. Group one consists of patients in which endodontic therapy was completed in a single appointment. Group two consist of patients wherein endodontic therapy was completed in multiple (two) appointments. Assessment of pain in postoperative phases was attempted by Visual Analogue Scale (VAS). Patients were asked to put a mark on anywhere on the VAS scale, having values from 0 to 170. The pain was monitored on a VAS scale for postoperative periods of 8, 16 and 36 hours.

Results: Results showed that three patients were in the age range of 26 to 30 years. P-value was reported to be significant here. Eight patients were noted in the second age range of 31-35 years. Eleven patients were identified in the age range of 36-40 years. In a group, I, mean VAS value in 8 hours postoperative period was 12.562. Standard deviation was 1.456, and standard error was 0.950. Level of significance evaluation revealed very crucial results. In group II, the mean VAS value in 8 hours postoperative period was 28.992. Standard deviation was 1.542, and standard error was 0.054. P-value was extremely significant here [0.002].

Conclusion: Authors concluded that there were no significant differences in the pain reported by the patients of both groups in 36 hours post-treatment phase. However, these differences were highly significant and imperative in 8 and 16 hours of post-treatment phases.

Keywords: Endodontic Treatment, Pain, Visual Analogue Scale.

INTRODUCTION

The International Association for the Study of Pain's widely used definition defines pain as "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage". In the field of medicine, pain is defined as an unpleasant feeling that is conveyed to the brain by sensory neurons.^{1,2}

Pain is significant in dentistry because the panic of pain is one of the major causes of dental anxiety. Pain in the maxillary or mandibular teeth are very common in society that makes patients seek necessary palliative therapies.^{3,4} Root canal therapy and tooth extraction are amongst the most commonly advised treatments for pain relief. Pain

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in post-treatment phase is one of the major dilemmas in endodontic therapy. It is commonly being felt even after potent anaesthesia administration. Literature has well evidenced that the overall success of endodontic therapy is mostly concerned with the removal of postoperative pain. Studies conducted in western countries have shown that dental pain usually ranges from 24 percent to 45 percent.^{5,6} Dental practitioners are habitually unenthusiastic to perform therapeutic procedures that involve multiple visits. Most of the endodontic therapies usually require multiple visits; hence treatment associated fear also increases in a similar ratio or proportion.^{7,8} This actually led the foundation stone of the concept of single visit therapy instead of multiple visits. However, many of the studies have shown that single visit endodontic therapies cannot be performed in all clinical situations. Complications like persistent pain, abscess and other related symptoms usually seen. The most common and consistent way for assessing the result of treatments is a randomized controlled clinical trial. In the past few years, there is an increasing concern about the requirement of multiple slots in endodontic therapies.^{9,10} Many pioneer workers have shown no significant differences in antimicrobial efficiencies between the single and multiple visit therapies. In addition, the modern development of rotary systems and up-gradations in the concepts of irrigation physics and delivery systems has assisted the mechanical instrumentation and disinfection of the root canal.^{11,12} This randomized controlled clinical trial based study was conducted to comprehensively evaluate the incidence of postoperative pain in single and multiple visit root canal treatment.

MATERIALS & METHODS

This study was designed, outlined and executed in the department of conservative dentistry and endodontics. In this cross-sectional study, a total of 50 patients were studied and evaluated for their responses related to pain. We have ensured to conduct the study in the patients who received endodontic therapy from the department of conservative dentistry and endodontics in the recent past. Only single-rooted teeth (maxillary central incisors) were selected in the study to avoid any biases related to a number of attempted root canals. Exclusion criteria included: underlying systemic disease, paediatric or geriatric patients,

apical periodontitis, periapical abscess, repeated therapies, ossified root canals, patients on non-steroidal anti-inflammatory drugs or corticosteroids at the time of treatment. Prior to the root canal treatment, comprehensive history was taken, including demographic details and pain-related episodes. As per the intended aim of the study, all patients were divided into two major groups of 25 each. Group one consists of patients in which endodontic therapy was completed in a single appointment. Group two consist of patients wherein endodontic therapy was completed in multiple (two) appointments. Few of the initial steps were common for both the Groups. These were local anaesthesia administration followed by rubber dam application, caries excavation if present and access cavity preparation. Root canal clearances were primarily inspected with 15 K file. Group one teeth were obturated at the first appointment with gutta-percha cones and sealer using lateral condensation technique. In Group two teeth, biomechanical preparation was completed by the standard manner, and obturation was attempted after one week. The temporary restoration was completed after obturation. Evaluation of pain in postoperative phases was attempted by Heft-Parker Visual Analogue Scale (VAS). All participating patients were explained in detail about this Visual Analogue Scale. Patients were asked to put a mark on anywhere on the VAS scale, having values from 0 to 170. The pain was monitored on a VAS scale for postoperative periods of 8, 16 and 36 hours. Written and informed consents were taken from all participants. Authors have determined to perform this study by a randomized controlled clinical trial because such studies are believed to be extremely valuable to obtain complete data about personal and group perceptions. Randomized controlled clinical trial studies are also competent in evaluating the patients at personal levels. The relative importance of the study was explained in detail to all participating patients. Results thus obtained was compiled and sent for necessary statistical analysis. P-value less than 0.05 was considered significant ($p < 0.05$).

RESULTS

All the recorded data and responses were compiled and sent for statistical evaluation using statistical software Statistical Package for the Social Sciences

version 21 (IBM Inc., Armonk, New York, USA). The resulting data were subjected to suitable statistical tests to obtain p values, mean, standard deviation, chi-square test, standard error and 95% CI. Table 1 and Graph 1 show that out of 50 patients, males were 32, and females were 18. Three patients were in the age range of 26 to 30 years. P-value was reported to be significant here. Eight patients were noted in the second age range of 31-35 years. Eleven patients were identified in the age range of 36-40 years. P-value was non-significant here. Maximum 15 patients were noticed in the last age group of >45 years. P-value was significant here. Table 2 illustrates the basic statistical explanation with the level of significance assessment using Pearson chi-square test [group I, n= 25]. Mean VAS values were very imperative here. Mean VAS value in 8 hours postoperative period was 12.562. Standard deviation was 1.456, and standard error was 0.950. Level of significance evaluation revealed very crucial results. P-value was very significant here. In 36 hours, Post-treatment period, the mean VAS was 7.180, which were quite close to the pre-treatment VAS values. Level of significance evaluation revealed very crucial results. P-value was very significant [0.001]. Table 3 shows the basic statistical explanation with the level of significance assessment using Pearson chi-square test [group II, n= 25]. Mean VAS values were very important here. Mean VAS value in 8 hours postoperative period was 28.992. Standard deviation was 1.542, and standard error was 0.054. Level of significance evaluation revealed very critical results. P-value was extremely significant here [0.002]. Mean VAS value in 16 hours postoperative period was 22.522 [p value was not significant]. In 36 hours, Post-treatment period, the mean VAS was 8.098, which were near to the corresponding pre-treatment VAS values. Level of significance assessment revealed very influential results. P-value was highly significant [0.005]. Table 4 & graph 2 shows inter-group comparisons to correlate VAS values and related inferences.

Table 1: Age & gender-wise distribution of patients.

Age Group (Yrs)	Male	Female	Total	P value
26-30	2	1	3 [6 %]	0.01*
31-35	5	3	8 [16 %]	0.50
36-40	8	3	11 [22 %]	0.90
41-45	9	4	13 [26 %]	0.10

			%]	
>45	8	7	15 [30 %]	0.02*
Total	32	18	100 %	*Significant

*p<0.05 significant

Graph 1: Age & gender-wise distribution of patients.

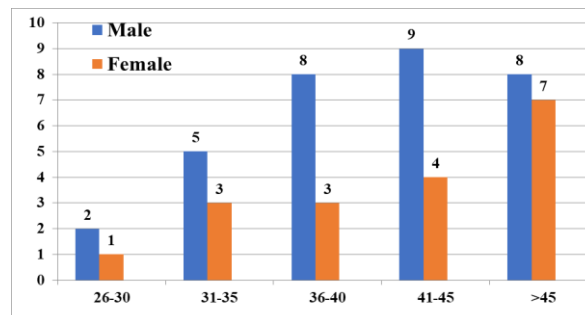


Table 2: Basic statistical explanation with the level of significance assessment using Pearson chi-square test [group i, n= 25].

Parameters	Mean VAS	Std. Deviation	Std. Error	95 % CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Before treatment	7.769	1.872	0.823	1.67	1.564	1.0	0.900
8 hours Post treatment	12.562	1.456	0.950	2.24	2.675	1.0	0.001*
16 hours Post treatment	10.902	1.904	0.648	2.98	2.566	1.0	0.080
36 hours Post treatment	7.180	0.554	0.758	2.34	1.646	2.0	0.001*

*p<0.05 significant

Table 3: Basic statistical explanation with the level of significance assessment using Pearson chi-square test [group ii, n= 25]

Parameters	Mean VAS	Std. Deviation	Std. Error	95 % CI	Pearson Chi-Square Value	df	Level of Significance (p-value)
Before treatment	6.348	1.098	0.9543	1.96	1.090	1.0	0.500
8 hours Post treatment	28.992	1.542	0.054	2.90	2.421	2.0	0.002*
16 hours Post treatment	22.522	1.097	0.623	2.32	2.904	1.0	0.060
36 hours Post treatment	8.098	0.550	0.709	2.86	1.875	2.0	0.005*

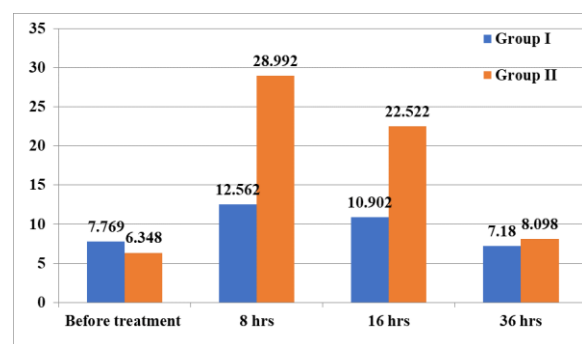
*p<0.05 significant

Table 4: Inter-group comparisons to correlate 'vas' values and related inferences.

Parameters	Mean VAS [Group I]	Mean VAS [Group II]	Level of Significance (p-value)
Pre-treatment	7.769	6.348	0.150
8 hours Post treatment	12.562	28.992	0.001*
16 hours Post treatment	10.902	22.522	0.008*
36 hours Post treatment	7.180	8.098	0.090

* $p < 0.05$ significant

Graph 2: Inter-group comparisons to correlate 'vas' values and related inferences.



DISCUSSION

In common dental practice, root canal treatment and tooth extraction are amongst the most frequently performed treatments for pain control. Irreversible blocking of the pain sensations during root canal therapy is attempted with the administration of local anaesthesia.¹³ However, controlling the painful sensations is controlled by prescribing over the counter non-steroidal anti-inflammatory drugs. These non-steroidal anti-inflammatory drugs are usually interfering prostaglandin creation at the site of a wound. In the routine root canal therapy, the operator usually attempts preparation of the root canals.^{14,15} This biomechanical preparation involves meticulous cleaning and logical shaping of the root canals followed by filling inert materials. With the newer advancements and discoveries in endodontics, the latest ideology of biomechanical preparation is changed. It is now aimed at shaping and cleaning instead of cleaning and shaping.^{16,17} This procedure of shaping and cleaning enables the effectual and proficient cleaning of the root canal milieu from the vegetating micro-organisms. Obturation is the

process to fill the canals with a biocompatible material. Obturation necessitates perfect funnel-shaped root canals that facilitate the accurate positioning of gutta-percha.^{18,19} Perfect obturation removes the future possibility of re-infection by sealing the canals apically. Existing literature on single-visit versus multiple-visit endodontics has shown a variety of intermingling concepts and facts.^{20,21} Even there are plenty of conflicting and contradictory opinions and recommendations. However, recent research papers have shown that patients usually bear and choose single-visit endodontic treatment. Consequently, single-visit root canal therapy has become a popular practice.²² Single-visit endodontic treatment also offers numerous benefits, including no risk of inter appointment leakage through temporary restorations. Additionally, patient desires and prospects for cure have made single-visit root canal treatment popular among dental practitioners.^{23,24} It is a well-established fact that single visit root canal treatment is less time taking and inexpensive. Moreover, a single visit root canal treatment is more demanding and suitable for busy patients belonging to executive and elite class. Single visit root canal treatment is a very attractive option for the patient since it is less time consuming and comparatively economical. Additionally, single visit therapy is usually less traumatic to the nervous patient. In single visit therapy, the patient is not bothered by the added anaesthetic doses.^{10,11,23,25}

CONCLUSION

Within the limitations of the study, the authors concluded that there was no significant difference in the pain reported by the patients of both groups in 36 hours post-treatment phase. However, these differences were highly significant and imperative in 8 and 16 hours of post-treatment phases. Here, the majority of the second group patients had experienced considerable pain. Therefore, multiple sitting endodontic therapies seem not to reduce the pain incidences, particularly in maxillary central incisors. So, single sitting endodontic therapies are appeared to be advantageous; however, it cannot be performed in all clinical circumstances uniformly. All clinicians must thoroughly estimate the teeth before finalizing the decision to go for single or multiple visit root canal therapies. Our study results must be considered as suggestive for presuming prognosis for similar clinical conditions. However,

we expect some other large-scale studies to be performed that might further establish a certain standard and authentic guidelines in these perspectives.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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