

**How to Cite:**

Sharma, D., Unadkat, H., Saoji, H., Patil, A., Sinha, A., & Thorat, R. (2022). Comprehensive assessment of post operative pain in single versus multiple visit endodontic treatment attempted in maxillary lateral incisors: An original research study. *International Journal of Health Sciences*, 6(S2), 7677-7684.  
<https://doi.org/10.53730/ijhs.v6nS2.6893>

## **Comprehensive assessment of post operative pain in single versus multiple visit endodontic treatment attempted in maxillary lateral incisors: An original research study**

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**Abstract**---Aim: This incidence based study was conducted to comprehensively assess the incidence of post-operative pain in single and multiple visit endodontic treatment attempted in maxillary lateral

incisors. **Materials & Methods:** This study was designed to conduct on the treated patient of department OPD. Patients were firstly explained about the study and asked to voluntarily participate in this study. Total 40 patients (both males and females) were selected and assessed for their reactions. Single rooted maxillary lateral incisors were included in the study. For ease of study, all participants were separated into two major study groups of 20 each. Group one has all participants wherein root canal treatment was completed in one visit. Group two has all participants wherein root canal treatment was completed in more than one visit (multiple). Estimation of pain in post-treatment visits was conducted by Visual Analogue Scale. Patients were explained about user instructions of this scale. They requested to make responses on VAS scale with prefixed values. Pain was observed on VAS scale in follow up stages of 12, 24 and 36 hours. **Results:** Data was subjected to appropriate statistical tests to obtain p values, mean, standard deviation, chi-square test, standard error and 95% CI. Out of 40 patients, males were 22 and females were 18. 13 patients were in age range of 25-33 years. P value was reported to be significant here (0.02). Mean VAS value in 12 hours after RCT was 13.032 (group I). Mean VAS values were exceptionally important here. Mean VAS value in 12 hours after RCT was 9.838 (group II) which was very much differed from group one. Inter-group evaluations to compare 'VAS' values and associated implications showed that p value was highly significant for 12 hours after RCT (0.001). **Conclusion:** Within the limitations of the study authors concluded that there were significant differences in the pain described by the participants of both groups in 12 hours after treatment. Pain was comparatively higher in single visit patients when compared to multiple visit patients. Nevertheless, it was non-significant and somewhat comparable in 24 and 36 hours post treatment phases of root canal therapy. It was therefore advocated that single visit root canal therapy can be safely implemented in single rooted teeth.

**Keywords**--endodontic treatment, pain, visual analogue scale, RCT.

## **Introduction**

It is very common in dental practice to see pain in the patients following root canal therapy (RCT). Patients can have these problems for smaller or longer episodes. Temporary pain related issues are usually due to inflammation of peri-apical tissues that induce pain mild or sometimes.<sup>1,2</sup> Common reasons of these pain and swelling are because of protrusion of armamentarium, reactions of irrigating mediums, contaminated debris and microorganisms into the peri-apical areas. On the other hand, insufficient instrumentation and sanitization of root canal can lead to microorganism perseverance inside the root canals. It may also increase the incidence of re-infection of peri-radicular tissues.<sup>3,4</sup> Single-visit root canal therapy endeavours biomechanical preparation with disinfection followed by obturation of the root canal system in single visit only. On the contrary, multiple-visit root canal therapy completes the biomechanical

preparation/instrumentation in the first and the obturation and disinfection in the subsequent visits. Researchers have done different studies on the number of appointments of root canal therapies. It is one of the most discussed in the literature. Mostly they explored tissue responses to pain and other symptoms after single sitting and multiple sitting root canal treatments.<sup>5,6</sup> Majority of the pioneer researchers have their own logic in favour of single sitting and multiple sitting root canal treatments. Infection and peri-apical tissue damage is primarily because of microbial activities. These processes are very vibrant that includes microbial and host defences at the intersection of contaminated dental pulp and periodontal ligament. All these intermingling activities results into peri-apical tissue damage and hard tissue breakdown. Conversely, end result is generally development of peri-apical lesions.<sup>7,8</sup> The successful therapy of apical periodontitis contains total eradication of microorganisms and also avoiding repeated infection. This study was performed to comprehensively assess the post-operative pain incidence in single and multiple visit root canal treatment attempted in maxillary lateral incisors.

### **Materials & Methods**

This study was abstracted, planned and conducted in the department of conservative dentistry and endodontics of the institution. Study patients were screened from department OPD in which root canal treatment was completed in one and multiple visits by final year post graduate students. Single rooted maxillary lateral incisors teeth were finalized with some exclusion criterion: mobile teeth, deciduous teeth, peri apical abscess, teeth with repetitive therapies, blocked root canals. Patients were initially explained about the study and requested to willingly participate in this study. Total 40 patients (both males and females) were selected and evaluated for their answers. All 40 patients were in the age range of 25-60 years (males 22 and females 18). Single rooted maxillary lateral incisors were included in the study. All participants were segregated into two major study groups of 20 each. Group one has all participants wherein root canal treatment was completed in one visit. Group two has all participants wherein root canal treatment was completed in more than one visit (multiple). Some of the clinical steps were similar in both groups like isolation measures and access opening. Obturation procedure was completed after seven days of biomechanical preparation for group two participants. Assessment of pain in both groups was performed by Visual Analogue Scale (Heft-Parker). Heft-Parker originally developed a Visual Analogue Scale (VAS) which is a calibration tool that attempts to calculate a characteristic or feelings.<sup>9</sup> It is usually presented as range of numbers and subject is asked to quantify his feelings in numbers. Visual Analogue Scale is frequently used in epidemiologic and clinical investigations to determine the amount or frequency of different parameters. A VAS is characteristically shown as a horizontal line, anchored with two verbal descriptors at the extremes where respondents indicate their perceived status by placing a mark along the horizontal line at the most suitable point. VASs are easy to comprehend, manage, and score, particularly when the VAS is programmed with a computer system. Informed consents were taken from all participants. Patients were explained about user instructions of this scale. They requested to make responses on VAS scale with prefixed values. Pain was observed on VAS scale in follow up stages of 12, 24 and 36 hours. 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 ( $p < 0.05$ ).

### Statistical Analysis and Results

All the gathered data and answers were compiled and sent for statistical assessment using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The substantial data was subjected to appropriate statistical tests to obtain p values, mean, standard deviation, chi-square test, standard error and 95% CI. Table 1 and Graph 1 demonstrate that out of 40 patients, males were 22 and females were 18. 13 patients were in age range of 25-33 years. P value was reported to be significant here (0.02). 14 patients were noted in second age range of 34-42 years. 6 patients were seen in age range of 43-51 years. P value was non significant here. Minimum 2 patients were seen in last age group of >60 years. P value was significant here (0.01). Table 2 demonstrates essential statistical description with level of significance assessment using pearson chi-square test [group I, n= 20]. Mean VAS values were extremely crucial here. Mean VAS value in 12 hours after RCT was 13.032. Standard deviation was 1.928 and standard error was 0.526. Level of significance assessment showed very important results. P value was very significant here (0.002). In 36 hours after RCT, the mean VAS was 4.890. Level of significance estimation showed very vital results. P value was very significant [0.005]. Table 3 demonstrates essential statistical description with level of significance assessment using pearson chi-square test [group II, n= 20: Multiple Sitting RCT]. Mean VAS values were exceptionally important here. Mean VAS value in 12 hours after RCT was 9.838 which was very much differed from group one. Standard deviation was 1.387 and standard error was 0.635. Level of significance evaluation showed very important results. P value was very significant here (0.008). In 36 hours after RCT, the mean VAS was 5.021. Level of significance assessment showed extremely imperative results. P value was highly significant [0.001]. Table 3 also illustrated inter-group evaluations to compare 'VAS' values and associated implications. p value was highly significant for 12 hours after RCT (0.001).

Table 1: Age & Gender Wise Allocation Of Patients

Age Group (Yrs)	Male	Female	Total	P value
25-33	7	6	13 [33 %]	0.02*
34-42	8	6	14 [35 %]	0.90
43-51	4	2	6 [15 %]	0.08
52-60	2	3	5 [12 %]	0.15
>60	1	1	2 [5 %]	0.01*
Total	22	18	100 %	* $p < 0.05$ significant

Graph 1: Age &amp; Gender Wise Allocation of Patients

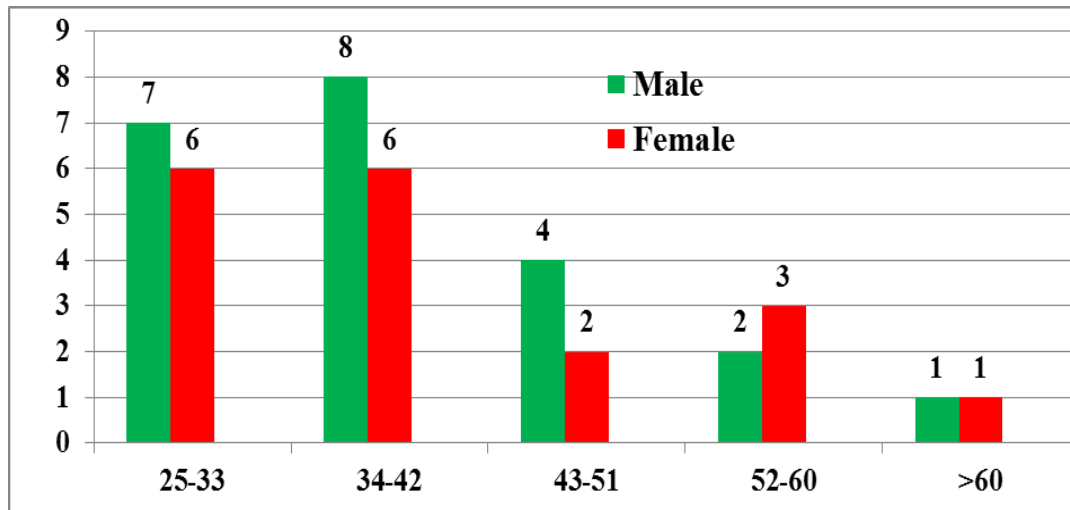


Table 2: Fundamental Statistical Description With Level of Significance Assessment Using Pearson Chi-Square Test [Group I, n=20]

Parameters (Single Sitting RCT)	Mean VAS	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
12 hours after RCT	13.032	1.928	0.526	2.02	2.592	1.0	0.002*
24 hours after RCT	8.182	0.038	0.602	2.82	2.926	1.0	0.090
36 hours after RCT	4.890	0.542	0.415	2.30	1.647	2.0	0.005*

\*p<0.05 significant

Table 3: Fundamental Statistical Description With Level Of Significance Assessment Using Pearson Chi-Square Test [Group II, n=20] And Inter-Group Evaluations

Parameters (Multiple Sitting RCT)	Mean VAS	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
12 hours after RCT	9.838	1.387	0.635	1.80	1.826	2.0	0.008*
24 hours after RCT	7.922	1.821	0.927	2.74	2.631	1.0	0.090
36 hours after RCT	5.021	0.502	0.721	2.12	1.842	2.0	0.001*
INTER-GROUP EVALUATIONS							
Timings of RCT	Mean VAS [Group I]		Mean VAS [Group II]		Level of Significance (p value)		
12 hours after RCT	13.032		9.838		0.001*		
24 hours after RCT	8.182		7.922		0.40		
36 hours after RCT	4.890		5.021		0.90		

## Discussion

The successful endodontic treatment is achieved by complete eradication of microorganisms from the root canal system and preparing a milieu which is most favourable for curing. As we all are aware that root canal therapy or endodontic therapy is the commonest procedure in clinical dentistry.<sup>10,11</sup> The major indications for root canal therapy are permanent like irreversible pulpitis or necrosis of the pulp tissue produced by decay procedures. The ultimate aim of root canal therapy is to stop progression of apical periodontitis.<sup>12-13</sup> With the technological advancements in the field of endodontics, newer instruments, materials and diagnostic aid are available for clinicians for better understanding of underlying pathology and their suitable management. All these factors have changed the overall face of endodontic therapy.<sup>14,15</sup> Moreover, people have ever increasing tendency of saving time by short clinical appointments and chair time. This actually laid the foundation stone of exploration of single visit endodontic therapy in contrast to the traditional multiple sitting therapies. It was also seems to be promising in reducing patients fear and anxiety of root canal therapy.<sup>16,17</sup> Researchers and clinicians had started utilizing and experimenting newer material and instruments to reduce the appointments. In reality, completion of successful root canal therapy in single visit has been acknowledged since the end of the nineteenth century.<sup>18,19,20</sup> Traditionally, root canal therapy or endodontic therapy was performed in multiple visits and it primarily aims to decrease or bacterial load and their derivatives from the root canal before obturation. Literature has well evidenced that multiple visit root canal treatment is considered secure.<sup>21,22,23,24</sup> The choice of single versus multiple visits root canal treatment for infected teeth was the matter of debate and research since years.<sup>25,26,27</sup> Raju and colleagues found no difference in occurrence of pain in single rooted teeth and multi rooted teeth after single visit therapy. Additionally they mentioned that relative incidence of post-operative pain does not appear to be a legitimate comparison criterion between single and multiple visit root canal therapies.<sup>28</sup> In a randomized controlled trial conducted by Alomaym and colleagues, it was concluded that the prevalence of pain was less in multiple visit group than single visit group, and it was statistically significant.<sup>29</sup> Their inferences were in accordance with our results.

## Conclusion

Authors have drawn very imperative cynical inferences in this study. Within the limitations of the study authors concluded that there were significant differences in the pain described by the participants of both groups in 12 hours after treatment. Pain was comparatively higher in single visit patients when compared to multiple visit patients. However, this must not be considered for all clinical circumstances particularly in posterior multi-rooted teeth. Furthermore, it was non-significant and somewhat comparable in 24 and 36 hours post treatment phases of root canal therapy. While implicating, clinicians should be confident and correlate these findings with clinical evidences also. It was therefore advocated that single visit root canal therapy can be safely implemented in single rooted teeth. Our study results must be considered as suggestive for estimating

prognosis for similar clinical conditions. Nonetheless, authors anticipate few other large scale studies to be conducted to set up few concrete and reliable guidelines.

### **Funding**

No external funds were allocated for this study.

### **Statement of conflict of interest**

In the opinion of the author, there was no conflict of interests.

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