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## **Incidence of postoperative pain in permanent teeth following single sitting endodontics**

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### **Abstract**

Single visit endodontics requires scientific knowledge and skill for the successful outcome of the root canal treatment. It needs knowledge of tooth morphology, basic principles of endodontics, professional acumen and operator skill to distinguish from simpler to complex anatomy, to complete the procedure within the stipulated time period without giving much discomfort to the patient and to prevent its reinfection. The present paper evaluated the effect of single sitting endodontic treatment along with demographic characteristics in permanent teeth on postoperative pain after 24hrs, 48hrs & 72hrs. Single sitting endodontics were performed on permanent teeth in patients in the age group of 14 to 60 yrs after selecting the subjects based on the inclusion and exclusion criteria. The pain was recorded after various time periods. The data was then subjected to chi square test.  $P < 0.05$  was selected as the significance level. It was found that incidence of pain has no significant difference after 24hrs, 48hrs & 72 hrs following single visit endodontics. The demographics characteristic were also found not statistically significant.

**Keywords:** Single visit endodontics, postoperative pain, permanent teeth

### **Introduction**

Postoperative pain following endodontics is always an unpleasant experience for both patients and clinicians. Studies have shown that the incidence of postoperative pain after root canal treatment ranges from 1.9%–48%<sup>[1]</sup>. Following sound biologic principles and contemporary scientifically based techniques has lead to a low incidence of postoperative pain. However prior information about the postoperative pain and their management by the use of analgesics according to the level of severity helps the patients increase their confidence in their clinicians as well as improves the attitudes towards future dental treatment<sup>[2]</sup>.

Single sitting treatment has become a preferred mode of management among the clinicians as the outcome or the success rate is comparable to the multi visit treatment<sup>[3, 4]</sup> with various added benefits. The single visit provides many advantages to the clinician as well as patients such as reduced number of visit, no repeated application of anesthetics or rubber dam and no use of intermediary restoration<sup>[5]</sup>. Also there is no inter appointment contamination of the canals and as the treatment completes within single visit there is no noncompliance by the patient in the form of discontinuing the treatment.

In Single visit endodontics, the teeth may have short term and/or long term complications. The short term complications includes mild pain, flare ups (Severe pain and swelling) and long term complications includes abscess, sinus tract formation, radio graphic signs of bone resorption, severe pain<sup>[5]</sup>. The pain and swelling may results from instrumentation or irrigation extending beyond the root canal into the periapical tissues transporting medications, infected debris and bacteria or insufficient instrumentation and disinfection resulting in bacterial persistence within the canals and subsequent recontamination of the periapical tissues<sup>[6, 7]</sup>.

Single visit endodontics is however not suitable in cases of restricted mouth opening, medically compromised patient, pregnant patients, TMJ disorders, in patients who are not able to open their mouth for longer periods or in cases with greater levels of difficulty such as aberrant anatomy or severe curvatures<sup>[5]</sup>.

This clinical study was undertaken to evaluate (1) the effect of single sitting root canal treatment in permanent teeth along with its demographic characteristics on the incidence of postoperative pain amongst various time periods (24, 48 and 72hours).

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**Methodology**

Single sitting endodontic treatment was performed on 100 permanent teeth of 80 Patients in the age group of 14 to 60 yrs who were referred to the Department of Conservative Dentistry & endodontics. The patients were selected randomly based on the inclusion and exclusion criteria. If the patient needed more than one endodontic treatment, the treatment was performed only when the previously treated tooth has becomes asymptomatic.

The inclusion criteria were positive patient acceptance, absence of pain in pulpally involved teeth with apical patency with or without periapical radiolucency, not having complex anatomy and have healthy periodontal conditions.

The exclusion criteria were systemic diseases, immuno compromised patient, patient with pain and limited mouth opening, patient with complex anatomy or with periodontal involvement or teeth where apical patency cannot be achieved.

All root canal treatment were performed using 2.5x magnifying dental loupes (Flipup Heine HR, Heine Optotechnix) by the author under local anesthesia (2% lidocaine with 1:100,000 ephinephrine).The access was made, canals were debrided, apical patency was established with 10K file and working length was determined. The cleaning and shaping were performed using crown down technique with Hyflex CM file (Coltene Whaledent) and protaper universal NiTi (ProTaper NiTi, Dentsply Maillefer, Ballaigues, Switzerland) rotary system. The Hyflex files were used when the canals were narrow or with curvature and the Protaper universal files were used for wide straight canals. 17% EDTA gel (Glyde Dentsply), 2.5% sodium hypochlorite and saline were used for irrigation. The canals were obturated with gutta percha in cold lateral compaction technique. The treated tooth access was restored with composite resin. The patients were recommended to take analgesic if needed.

**Pain was categorized [19] as**

1. No pain
2. Mild pain requiring no analgesics
3. Moderate pain requiring analgesics
4. Severe pain not relieved by analgesics

The pain was recorded after 24, 48, and 72hrs. The data was collected and analyzed using chi square test to determine whether the incidence of pain was statistically different amongst different time period and also amongst demographic characteristics (Age, gender, anatomy, Pulpal status and arch). A p value of less than 0.05 was considered statistically significant.

**Table 2:** Independent variables according to postoperative pain incidence with varying time periods following Single Sitting Endodontics (n=100)

Variable	Category N=100	Pain Incidence			Pvalue (P<.05)
		24hrs 28(28%)	48hrs 10(10%)	72hrs 6(6%)	
1. Age	<30(N=45)	7(15%)	2(4%)	1(2%)	X <sup>2</sup> -0.25 P-0.88
	>30(N=55)	21(38%)	8(14%)	5(9%)	
					Not Significant
2. Gender	Male(N=55)	12(22%)	4(7%)	2(4%)	X <sup>2</sup> -0.18 P-0.90
	Female(N=45)	16(35%)	6(13%)	4(9%)	
					Not Significant
3. Pulpal Status	Vital(N=57)	10(17%)	3(5%)	2(3%)	X <sup>2</sup> -0.10 P-0.94
	Nonvital(N=43)	18(42%)	7(16%)	4(9%)	
					Not Significant
4. Arch	Max.(N=49)	15(31%)	6(12%)	4(8%)	X <sup>2</sup> -0.39 P-0.81
	Mand.(N=51)	13(25%)	4(8%)	2(4%)	
					Not Significant
5. Teeth	Anterior(N=22)	3(14%)	2(9%)	1(4%)	X <sup>2</sup> -1.09

**Result**

The single sitting endodontics were performed on 100 permanent teeth of 80 patients (43 Male, 37 Female) in the age group of 14 to 60 years with an average age of 37yrs.

**Patients and age**

The distribution of 100 single visit endodontic treatment among patients were three root canal treatment were performed in each of the 3 patients, two root canal treatment were performed in each of the 14 patients while one root canal treatment was performed in each of the 63 patients. The 55 treatments were done in 43 male patients while 45 were performed in 37 female patients. The 45 treatments were performed in patients with age less than or equals 35years while 55 were done in patients with age above 35 years

**Arch, pulpal status & teeth**

The 49 treatments were performed in maxillary teeth while 51 were performed in mandibular teeth. The 57 treatments were done in teeth with vital inflamed pulp while 43 were performed in non-vital teeth. The treatment was undergone in 22 incisors & canines, 26 premolars and 52 molars teeth.

**Incidence of pain**

Majority of the patients (72) had no pain. None of the patients had severe pain. Overall Pain was seen in 28 teeth after 24hrs, 10 teeth after 48hrs & 6 teeth after 72hrs.

Mild pain was seen in 24 teeth after 24hrs which decline to 8 teeth after 48hrs & 5 teeth after 72hrs

Moderate pain was seen in 04 teeth after 24hrs which falls to 2 teeth after 48hrs & 1 teeth after 72hrs.

There was reduction of postoperative pain in all cases but were not statistically significant. Pain was seen after 24 hrs which however was gradually decreased thereafter (Table 1).

There was no statistical significant difference between the demographic characteristics which includes age groups (less than or equal /more than 35 yrs), gender (Male/Female), Pulpal status (Vital/Non vital), Arch (Maxillary/Mandibular), Anatomy (Anterior, premolar, molar) (Table 2).

**Table 1:** Incidence of Postoperative Pain amongst various time period following single sitting endodontics (n=100)

Time	No Pain		Pain		Pain (%)	P value
	0	1	2			
24hrs	72	24	04		28	X <sup>2</sup> -0.18 P-0.91
48hrs	90	08	02		10	
72hrs	94	05	01		06	
						Not significant

	Premolar(N=26)	9(35%)	3(11%)	1(4%)	P-0.89
	Molar(N=52)	16(31%)	5(10%)	4(8%)	
					Not Significant

## Discussion

Various studies has shown that the outcome of endodontic treatment performed in either single or multiple visit were similar provided the standard procedures were followed judiciously [8, 9, 10, 11]. The purpose of this study was to evaluate the incidence of pain following single visit endodontics in permanent teeth. It was found that the majority of the patient recorded no pain after treatment. In patients who experience pain it was found that the incidence of pain was low which gradually declines with time from 24 to 72 hrs. This finding is in agreement with the previous study [11, 12, 18] where they found that most of the postoperative pain occurs on the first day after the treatment and subsequently decreases with time. Pain in all the cases were subsided with the use of mild analgesic, none of the patient had severe pain. This observation is similar with the result of previous study [13]. This finding suggests that the elimination of source of infection or inflammation from the canal relieve the endodontic pain and the mild pain which if present is due to the periradicular inflammation and is not due to periradicular infection [14].

The subject selection for single visit endodontics in this study were similar to the study done by oliet [15]. Studies [16] have found that the prevalence of pain after single visit treatment was significantly higher in older patients (41-65yrs) than younger (15-40). They provided less pain tolerance, less blood flow and delayed healing as the reason for higher pain in older patients. Studies [16, 17] have reported that women experienced more pain than men following treatment. They presented biological differences among the gender which might have influenced the postoperative pain. The present study demonstrated no statistical significant difference in pain perception based on the age or gender of the patient. These results were consistent with the findings of previous study [13, 18].

The previous study [12] have explained the incidence of pain in premolar and molar teeth due to complex structure of the molar teeth and as a result of increased difficulty level in posterior regions. This study has also found similar observation. Incidence of pain in premolar and molar teeth were more however there was no statistical significant difference found between the anterior, premolar and molar teeth.

Studies have found pain associated with non-vital teeth [19] as well as with vital teeth [19]. However in this study vital pulp had lower frequency of pain than those of non-vital pulp but were not statistically significant. This finding was in agreement with the previous study [12] that reported that the postoperative pain was not related to the pulpal status.

Several studies [17, 20] have found that mandibular teeth had a higher chance of postoperative pain because of dense trabecular pattern. The previous study [21] also have reported incidence of pain in the maxillary teeth following treatment. This study found that there was no significant difference in the incidence of pain based on maxillary or mandibular teeth. This result is similar to the findings previous studies [12, 18].

## Conclusion

Single visit treatment is now considered to be more commonly used, safe and effective treatment modality in comparison with multi visit treatment. This has overcome the

problems of multi visit treatment wherein the patient does not attend to further treatment once the pain has been relieved. However multivisit should be considered in case related difficulties. The professional acumen decides which option of the treatment to proceed with as both the management technique caters the similar outcome. Thus it can be concluded from the study

- Single visit endodontic treatment does not deviate from multiple visit endodontic therapy in achieving the basic objectives of endodontic therapy
- Single sitting endodontic was found to be successful with lower incidence of Postoperative Pain irrespective of Age, Gender, Anatomy, Pulpal status & Arch

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