

## Post-Obturation pain following one-visit and two-visit root canal treatment in necrotic anterior teeth

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### Abstract:

**Background:** To investigate and compare the post-obturation pain after one-visit and two-visit root canal treatment in non-vital anterior teeth.

**Materials & Methods:** One hundred forty eight patients requiring root canal therapy on permanent anterior non-vital teeth with single root were included in this study. Patients were randomly assigned to either the one-appointment or the two-appointment group. The standardized protocol for all the teeth involved local anesthesia, isolation and access, engine-driven rotary nickel-titanium canal instrumentation with 2.5% NaOCl irrigation and obturation. Teeth in group 1 (n = 74) were obturated during the first appointment by using laterally condensed gutta-percha and resin sealer. Teeth in group 2 (n = 74) were given closed dressing and were obturated during the second appointment, 7 to 14 days later. A modified Visual Analogue Scale was used to measure pain after 6 hours, 24 hours, 48 hours and 7 days after the treatment. Statistical analysis was done to compare groups at each interval by using an independent-samples t test.

**Results:** The incidence and intensity of post-obturation pain in both Group 'A' and Group 'B' gradually reduced over the study period. When the incidence of pain was compared in the single and two visit group, it was found that the single-visit group

experienced slightly less pain than the two-visit group during all study intervals, but the difference found was not statistically significant.

**Conclusion:** There was no difference in postoperative pain between patients treated in only one appointment and patients treated in two appointments. The majority of patients in both groups reported no pain or only minimal pain after 7 days of treatment.

**Key Words:** Necrotic teeth, post-obturation pain, randomized clinical trial, root canal treatment

### Introduction

Postoperative pain after nonsurgical root canal treatment has been reported to range from approximately 3% to more than 50%.<sup>1,2</sup> Post-operative pain after endodontic procedures is an undesirable occurrence for both patients and clinicians. Pain has an adverse effect on a patient's daily routine. Multiple-visit root canal treatment is well-accepted as a safe and a common therapy.<sup>3</sup> In recent years, there is a growing concern about the necessity of multiple appointments in endodontic treatment because no significant differences in antimicrobial efficacies have been reported between the single- and multiple-visit treatments.<sup>4</sup> Furthermore, the recent invention of rotary nickel-titanium systems and improvements in the understanding of irrigation dynamics have facilitated the mechanical instrumentation and disinfection of the root canal, which makes the single-appointment treatment more convenient and an acceptable treatment regime than before.

The preponderance of the research to date, has shown either, no significant difference in postoperative pain when one-visit root canal treatment is compared with multiple-visit treatment<sup>1,2,5</sup> or less pain in 1-visit treatment in vital teeth<sup>6-8</sup> when compared to multiple visit treatment. However, many of them are retrospective studies. Fewer studies have been conducted on non-vital teeth and in many of these studies no consensus has been reached.<sup>8-10</sup> Therefore, the more important questions concerning the

incidence of postoperative pain for non-vital teeth remains unanswered. The purpose of this clinical study was to evaluate the incidence and severity of postoperative pain after root canal therapy performed in one appointment and two appointments.

### Materials and Methods

Study subjects were recruited from the pool of patients referred to the Endodontic Clinic for nonsurgical root canal treatment for anterior teeth. The primary inclusion criteria were,

1. Tooth should be non-vital, i.e. negative test of pulpal sensitivity by thermal stimuli prior to anesthesia and no bleeding response on access to the pulp.
2. Tooth should have single uncomplicated canal with fully formed apex.

Patients excluded from the study were those:

1. With complicating systemic disease.
2. Having severe pain and/or acute apical abscesses.
3. Under 18 years of age.
4. Using antibiotics or corticosteroids.
5. Having multiple teeth that required treatment.
6. With non restorable and periodontal compromised teeth.

After initial screening, one hundred and forty eight patients in the age group of 18- 50 years were included in the study. Root canal therapy and the study were explained to the patients. Oral and written informed consent was obtained. The patients were randomly assigned to either the one-visit (Group A) or two-visit (Group B) by using a set of random numbers generated by one of the investigators.

The standard procedure for both groups during the first visit included administration of local anesthesia (2% xylocaine with 1:2,00,000 epinephrine), rubber dam isolation, and standard access preparation. Then orifice openers were used for enlarging the coronal third of the canal. 15% EDTA with carbamide peroxide (RC Prep, Premier Dental Product Co. King of Prussia, PA, USA) was used as a lubricant and 2.5% NaOCl, saline was used as irrigants. The working length of each canal was determined by an electronic apex locator and 2 or more angled radiographs. Canals were prepared with a combination of hand files (K file, Mani, Japan) and ProTaper (Dentsply Maillefer, Ballalgues, Switzerland), engine-driven rotary nickel-titanium files using the hybrid technique. After instrumentation and final irrigation, canals were dried with paper points. Teeth in Group B were sealed with a sterile

dry cotton pellet and temporary filling material. Teeth in Group A were obturated during the initial appointment with guttapercha cones and Resin sealer (AH plus, Dentsply, Konstanz, Germany) using lateral condensation technique. Patients in Group B were called for the second appointment one week later and the teeth were obturated with the same methods and materials used as in Group A. All patients were prescribed 50 mg of diclofenac potassium, to be taken only if they experienced moderate pain. Any of the patients with intolerable pain were requested to visit the clinician for emergency treatment.

The evaluation of post obturation pain was done with the modified visual analogue scale (VAS). The post-operative evaluation was recorded as,

0 - No pain

1 - Slight pain/discomfort

2 - Moderate pain relieved by analgesics

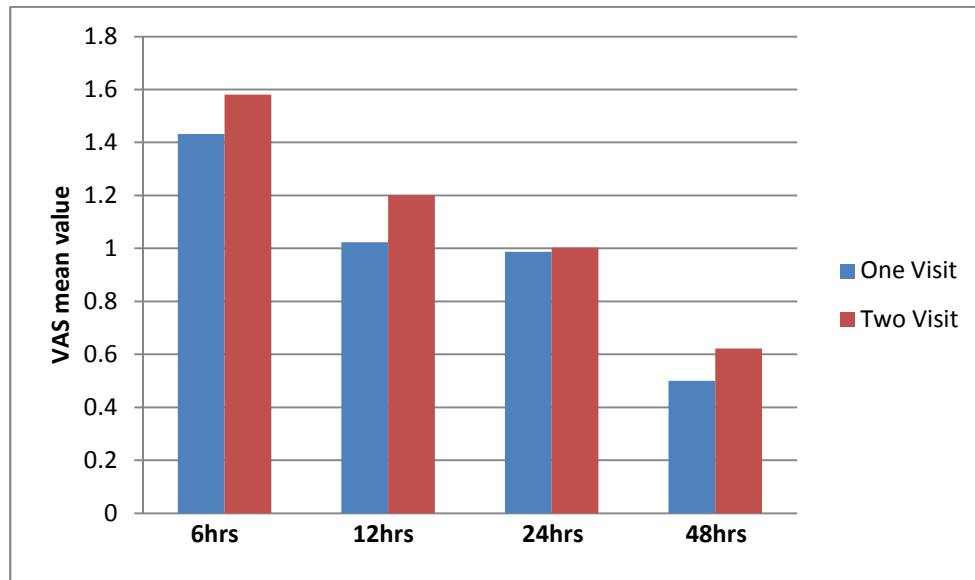
3 - Moderate to severe pain not completely relieved by analgesics

4 - Severe pain/swelling not relieved by analgesics and required unscheduled visit

The patients carried the visual analogue scale form with them and were told to mark the level of pain at 6 hour, 24 hour, 48 hour, and 7 days after treatment. Patients were asked to return for clinical examination 1 week after completion of the root canal treatment. Results were statistically analyzed using independent sample t-test. Differences were considered significant when the probabilities were equal to or less than 0.05.

### Results

Study comprised of one forty eight patients. In seventy four patients root canal treatment was performed in one-visit (Group 'A'), whereas in the remaining seventy four patients the root canal treatment was performed in two-visits (Group 'B'). From these data it is apparent that the incidence of pain was greatest during the first 48hrs after obturation. No specific differences between the pain categories, slight, moderate, or severe, were identified. None of the patients required unscheduled appointment for emergency treatment. The incidence and intensity of post-obturation pain in both Group 'A' and Group 'B' were gradually reduced over the study period (Figure 1). When the incidence of pain was compared in the single and two visit group, it was found that the single-visit group experienced slightly less pain than two-visit group during all study intervals, but the difference found was not statisti-



**Figure 1:** comparison of post operative pain

-cally significant. The 'P' value recorded at the specified time intervals are tabulated below.

Time	P Value
6 Hrs	0.2570
24 Hrs	0.1650
48 Hrs	0.9036
7 days	0.3249

## Discussion

The adoption of clinical procedures in endodontic therapy depends not merely on their efficacy or biological consequences but also on minimization of patient's discomfort. Researches are focused on issues relevant to the treatments or techniques aimed to provide evidence to support clinical decisions. Many studies have compared post-obturation pain following one-visit and multi-visit RCT (Soltanoff 1978<sup>11</sup>, Roane 1983<sup>7</sup>, Albashaireh & Alnegrish 1998<sup>6</sup>, Eleazer&Eleazer 1998<sup>8</sup>, Al-Negrish & Habahbeh 2006<sup>12</sup>), with contradictory findings. The aim of this study is the investigation of the incidence of post obturation pain, however, there are very few studies which have investigated this.

Calcium hydroxide paste is one of the most commonly used intracanal medications for multiple appointment root canal therapy, however, there is a growing body of evidence that questions its effectiveness.<sup>13</sup> The results of a study showed no significant differences in post-treatment

pain between the Ca(OH)<sub>2</sub> groups and the dry cotton pellet groups.<sup>14</sup> Another study has shown that calcium hydroxide fails to produce sterile root canals and even allows re-growth of microorganisms in some cases.<sup>4</sup> In a study based on clinical outcomes, no additional benefit by the use of an inter-appointment antibacterial dressing such as calcium hydroxide was shown.<sup>15</sup> On the other hand, studies have shown that rotary instrumentation and antimicrobial irrigation of the root canal system can substantially reduce the number of cultivable microorganisms.<sup>16,17</sup> The sealer and gutta-percha are also confirmed to possess the antibacterial ability and thus be capable of eliminating the residual bacteria after instrumentation.<sup>18</sup> Therefore, no intra-canal medicament was used in this study and same standard protocol for root canal treatment for both groups is followed to achieve maximum success.

Although the two visit patients seemed to experience more pain than did the single visit patients during the first 48 hrs, the differences were not statistically significant. This finding is supported by the finding of Alacam<sup>19</sup>, Fava<sup>20</sup>, Pekruhn<sup>21</sup> and Direnzo.<sup>22</sup> The lower incidence of post-obturation pain in single-visit root canal treatment might be attributed to immediate obturation, thereby avoiding passage of medications, repeated instrumentation, and irrigation. Moreover, a single-visit approach might also prevent the occurrence of pain resulting from reinfection of the canals as a consequence of bacterial ingress from a leaky temporary restoration or lateral canal.<sup>8</sup> On the

contrary, the multiple-visit technique involves the placement of a temporary seal and the repeated physical and chemical stimulation to periapical tissues.

Relatively a higher percentage of patients experienced the pain during the first 2 days after obturation. The incidence and intensity of post-obturation pain in both Group 'A' and Group 'B' gradually reduced over the study period. This was found in agreement with the findings of other studies.<sup>6,12,19</sup> This should draw the attention of dentists to not over-react to early post obturation symptoms by immediately initiating root canal retreatment. It is often difficult to compare results from different studies because instrumentation and obturation techniques vary widely, especially in studies that are more than several years old.

Our results are consistent with those of the majority of the published reports on this topic. That is, post-operative pain associated with one-appointment root canal treatment is generally the same as postoperative pain associated with two-visit treatment. On the basis of the results obtained from a study it seems reasonable to state that one-visit root canal treatment can be carried out successfully if strong emphasis is given to an aseptic operating protocol and proper instrumentation and obturation.

### Conclusions

Within the limitations of the present study, the following conclusions were drawn:

1. There is no statistical difference between one-visit and two-visit root canal treatment on comparing the post-obturation pain at each study period (6hrs, 24hrs, 48hrs, 7 days).
2. The incidence and intensity of post-obturation pain in both Groups were gradually reduced over the study period.

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