



Comparative Evaluation of Pain Perception after Single Vs Multiple Visit Root Canal Treatment: An In-Vivo Study

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Abstract

Background: Postoperative pain is a frequent complication associated with root canal treatment and can be influenced by insufficient root canal preparation, extrusion of irrigant, debris or intracanal medicament, presence of preoperative pain, presence of periapical pathosis, and apical patency during root canal instrumentation. For both the patients and the clinicians, the occurrence of post-treatment pain is undesirable. Pain hurts a patient's daily routine. One of the common treatment protocols well accepted in terms of safety and efficacy is multiple sitting root canal therapy. Hence, we undertook the present study to assess the incidence of post-treatment pain in patients undergoing single sitting and multiple sitting root canal therapy.

Material and method: The present study included the assessment of 50 patients who underwent treatment with root canal therapy. Complete details of the age, gender of all the patients and status of the pulp of the involved teeth were also recorded in detail. All the teeth were divided broadly into two study groups. The first group included single sitting root canal therapy cases while the other group included multiple sitting root canal cases. Postoperative pain was determined by using Visual Analogue Scale scores after 24 hrs.

Result: A total of 50 subjects were included in the present in-vivo study, in which 28 (Group I= 13, Group II= 15) were male and 22 were female (Group I= 12, Group II= 10). The incidence of post-obturation pain, in both groups, was gradually reduced after 24 Hrs. But, no statistically significant differences were found in the pain levels between single or multi-visit protocol at 24 Hrs intervals.

Conclusion: There is no difference in the incidence of post-treatment pain in patients undergoing single sitting and multiple sitting root canal therapies.

Keywords: Root canal treatment, Single visit, Multi visit, Postoperative pain, VAS scale

Introduction

The goal of root canal treatment is to provide an environment in the periapical tissues that irradiate infection and encourage the reestablishment of normal tissues. Endodontic treatment is the choice of treatment for irreversible pulpitis with or without periapical lesion, with up to 98% success rates. [1]

Historically root canal treatment was performed in multiple visits mainly to ensure sterility of the root canal system before obturation. As complete sterilization was not possible with biomechanical preparation and irrigation, intracanal medicaments were used to ensure the complete eradication of bacteria. In addition to killing bacteria, these agents, primarily phenolic compounds, were also highly irritating to the periradicular tissues. [2,3] Overzealous use of these medicaments led to postoperative complications that were erroneously identified as persistent periradicular infections. Hence, this led to the inappropriate and excessive use of antibiotics to control infections. Ultimately the deleterious effects of these medicaments were identified, and their routine clinical use was discontinued. This led to one of the two courses of treatment either treating the root canal in one visit or seeking an intracanal medicament that does not injure the periradicular tissues. [4]

Postoperative pain is unwanted but is not an uncommon occurrence irrespective of the method adopted i.e. single visit or multiple visits. Hence the purpose of the present research is to evaluate the postoperative pain after single vs multiple visit root canal treatment.

Material and Methodology

The present study was conducted after obtaining ethical clearance from the committee and written consent was obtained after explaining in detail the entire research protocol.

Patients who were pregnant, taking antibiotics or corticosteroids at the time of treatment, with immunocompromised, complicating systemic disease, or below 18 years of age were excluded. Only one tooth with a single root of each patient was included, and the pulpal vitality determination was done. The vitality of pulps was ultimately confirmed by direct clinical observation of hemorrhage in the canal, without considering the clinical diagnosis as being a normal pulp, reversible pulpitis, or irreversible pulpitis. All teeth had completely formed foramina and no calcified canals, which were preliminarily evaluated by preoperative periapical radiographs. Any tooth with periodontal disease or periapical radiolucency of more than 0.5 cm was excluded.

A total of 50 patients aged between 20-30 years were included in the study. Patients were randomly divided into control groups: Single visit (Group I = 25) and multiple visits (Group II = 25). All procedure was explained to the patients and informed consent was obtained before initiating the treatment. All patients were administered local anesthesia of 1:80,000 lignocaine with adrenaline. Access was gained in the symptomatic tooth with a size 4 round bur using an air turbine handpiece under copious water cooling. A size 10 K file was inserted into the root canal to determine the working length with the help of a radiograph. The root canals were instrumented with Protaper Next (Dentsply) using an endodontic motor under copious irrigation with 3% sodium hypochlorite. The root canals were flushed with 5 ml of 17% EDTA solution. In the control group, following completion of biomechanical preparation, final irrigation was performed using 5 ml of 0.9% physiological saline solution at room temperature.

Canals in Group 1 were dried with paper points and obturated using 6% 30 gutta-percha cones with zinc oxide eugenol as sealer using a lateral compaction technique, and restored with temporary restorative material, Cavit-G.

Following instrumentation, teeth in Group 2 a sterile dry cotton pellet was placed in the pulp chamber and the access was temporarily sealed using Cavit-G. Patients in Group II returned for the second visit 1 week later when the root canals were filled and teeth temporarily restored using the same technique and materials as in Group I.

Each patient was instructed to assess the post operative pain/ discomfort. This was carried out using a questionnaire that assessed the numeric evaluation of pain/discomfort. Postoperative pain was determined by using Visual Analogue Scale scores after 24 hrs. The VAS included a 10 cm straight horizontal line numbered at each centimeter with the following criteria; 0-1- no pain; 2-3- mild pain; 4-6- moderate pain; 7-10-severe pain. The data were entered over a spreadsheet, and statistical analysis was performed using SPSS software version 17 (IBM, Chicago, United States).

Result

A total of 50 subjects were included in the present in-vivo study, in which 28 (Group I= 13, Group II= 15) were male and 22 were female (Group I= 12, Group II= 10). **(Table no 1)** The incidence of post-obturation pain, in both groups, was gradually reduced after 24 Hrs. But no statistically significant differences were found in the pain levels between single or multi-visit protocol at 24 Hrs intervals. **(Table no. 2)**

Table no. 1: Distribution of sample

Group	Gender	
	Male	Female
Group I	13	12
Group II	15	10

Table no. 2: Comparative evaluation of mean VAS score

Time interval	Mean VAS score	P value
Preoperative	Group I 7.89 ± 0.42	>0.05
	Group II 7.48 ± 0.46	
After 24 hrs	Group I 4.56 ± 0.36	>0.05
	Group II 4.64 ± 0.52	

Discussion

The primary objective of performing endodontic therapy is to eliminate microorganisms from the entire root canal system and create an environment that is most favorable for healing. [5,6]

Postoperative pain, described as the perception of any annoyance after root canal treatment, is reported by 25- 40% of patients, regardless of their pulp and peri-radicular status. Post-endodontic pain usually occurs during the first 2 days after treatment, and generally diminishes after a few hours. However, it sometimes persists for several days We conducted the present study to compare the incidence and intensity of post-obturation pain after single or multi-visit root canal treatment on single-rooted teeth

In 1978, Ether and colleagues and in the same year Soltanoff *et al.* examined the incidence of pain while comparing the single and multiple visit endodontic procedures and concluded a significantly higher number of patients with no pain in the group that had the multiple-visit procedure than in the single-visit group. Recently Singh S et al. in 2012 found no statistically significant between the pain levels of teeth treated in the single and multi-visit group.

From the above-discussed literature, it is clear that although results of some studies are in the favor of single visit root canal treatment in terms of pain incidence and others favor multi-visit procedures but the majority of literature published on the comparison between single and multi-visit root canal treatment deny any significant difference in the level of post obturation pain between the two.

In the present study, we observed that in patients undergoing multiple sitting root canal therapy, no significant decrease in the incidence of post-treatment pain occurs in comparison to patients undergoing single sitting root canal therapy. Wang C et al compared the incidence and intensity of post-obturation pain after one- or two-visit root canal treatment (RCT) on anterior teeth with vital pulps and a single root and canal in a randomized controlled trial. The author found no significant difference in incidence and intensity of post-obturation pain following one- or two-visit RCT on teeth with vital pulp which is by the result of our study.

During multiple-visit root canal treatment, an antibacterial medication like calcium hydroxide is placed in the root canals, thereby aiming to further disinfect the canals between treatment appointments, the efficacy of which remains unclear at present. [9,10] In contrast, in single-visit root canal treatment any further appointments and intracanal medications are omitted, and the root canal system obturated directly after instrumentation and irrigation, aiming to seal remaining bacteria and deprive them of both space and nutrition. [11,12]

Future trials are thus needed to gain firm evidence of whether differences in outcomes between single-visit or multiple-visit root canal treatment exist. To improve validity and comparability, these trials should aim for standardized outcome measures (eg, the visual analog scale for pain assessment; agreed definition for success/ failure), long-term follow-up periods and limited risk of bias (while certain biases

cannot be fully excluded). They should best be performed in representative settings and populations and report in detail on confounders of treatment success.

Conclusion

There is no difference in the incidence of post-treatment pain in patients undergoing single sitting and multiple sitting root canal therapies. However, there is no difference in the incidence of post-treatment pain in patients undergoing single sitting and multiple sitting root canal therapies.

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