



Postoperative pain and flare-up in one- and multiple-visits endodontic treatment for pulpally vital molars

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Abstract

In recent years, one appointment endodontics has gained increased acceptance as the best treatment for most cases. The aim of this study was to analyze the incidence of post-operative pain and flare up following single-visit and multiple-visits root canal treatment in pulpally vital molars using two different instrumentation techniques. One hundred seventy seven (177) vital molars teeth from 160 patients were selected and randomly divided into two groups; first group (89) teeth were endodontically treated with multiple visits while the second group (88) teeth were endodontically treated with one visit. Each group further subdivided into two subgroups; first subgroup, canals were prepared by conventional step-back technique using hand-held stainless steel k-files and obturated with laterally condensed gutta-perch cones while the second subgroup were the canals prepared by ProTaper rotary system and obturated with laterally condensed gutta-perch cones. No significant differences in post operative pain and flare-ups between teeth that were treated in one visit and multiple visits. Also the use of the ProTaper rotary system in preparing the canals contributed to lower the incidence of post-operative pain.

Key words: one visit, multiple visits, postoperative pain, step-back, ProTaper.

Introduction

Endodontic therapy in defense dental setup should be simple, predictable and time saving. Root canal treatment (RCT) is the preferred management modality for root canal infections. The execution of RCT is more challenging and demanding in molars for their unique multi canal system. Single visit root canal treatment was tried to assess its viability in defense environment.⁽¹⁾

In recent years, one appointment endodontics has gained increased acceptance as the best treatment for most cases. Some endodontists even feel that there are few cases that cannot be treated successfully in one appointment.⁽²⁾ Treatment in one visit certainly has many advantages. It is

less time-consuming, resulting in less cost for the patient and potentially more profit for the dentist. In addition, numerous studies have shown that postoperative pain is equally low when the treatment is performed in one or multiple visits.⁽³⁻⁵⁾

Some of the problems of root canal treatment are post-obturation pain, inter-appointment pain and swelling. Although these in most cases do not last long, but could be a source of embarrassment to the dentist and annoying for the patient, more so if the tooth was symptomless before the commencement of treatment. Literature review revealed varied opinions on the incidence and severity of post-obturation pain⁽⁶⁾. Some

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authors reported slightly more post-obturation pain following single visit than with multiple visit procedures^(7,8). Others found no significant differences in the post-obturation pain experienced by patients following single or multiple visit treatment procedures⁽⁹⁾. The rate of endodontic flare-ups was reported to be more following multiple visits than for the single visit⁽¹⁰⁻¹²⁾. Sathorn et al¹³ in their study concluded the compelling evidence indicating a significantly different prevalence of post operative pain /flare-up of either single- or multiple-visits RCT is lacking.

The purpose of this study was to analyze the incidence of post-operative pain and flare up following single-visit and multiple-visits root canal treatment in pulpally vital molars using two different instrumentation and obturation techniques.

Materials and Methods

Endodontic treatment was carried out in one private dental clinic located in Baghdad city collected over eleven months, all the clinical procedures performed by one specialist. One hundred seventy seven (177) molars teeth with symptomatic vital pulps from one hundred and sixty (160) patients aged from 15 to 70 years were used in this study. The pulp vitality was determined by an electric pulp tester (pulp vitality tester, Germany) in combination with the presence of pulpal haemorrhage⁶. The entire patients were not taking any medication nor had they received them within 30 days before participation in the study.¹⁴

Treatment protocols were standardized; each patient was anesthetized with 2% xylocaine with or without epinephrine, a rubber dam was put in place, after access cavity preparation and pulp extirpation, #8 or

#10 stainless steel K-file is used to insure canal patency and a normal sterile saline solution was used for irrigation of the root canal throughout the treatment. The working length (WL) was estimated with a #20 stainless steel K-file (from the crown to 0.5 mm shorter than anatomical root apex) using digital apex locator (IPEX NSK apex locator, Japan) and confirmed by periapical radiography. The teeth were divided randomly into two groups according to single or multiple-visits endodontic treatment and each group also randomly subdivided into two subgroups according to the type of instrumentation technique as follows:

Group A:

The canals of the first (89) teeth were endodontically treated with multiple visits (3-4 visits), one week interval between visits, dividing them into two subgroups, subgroup A1: first 47 teeth, canals were prepared by step-back technique using hand-held stainless steel k-files (DENTSPLY, USA) and obturated was carried out with laterally condensed gutta-percha cones (Gapadent, Germany) and eugenol based sealer. Subgroup A2: second 42 teeth, canals were prepared by Protaper nickel-titanium engine driven rotary system with aid of X-smart machine (DENTSPLY, USA). and the obturation was carried out using laterally condensed gutta-percha cones and eugenol based sealer.

Group B:

The canals of the second (88) teeth, steps of root canal treatment (pulp extirpation and working length determination, instrumentation, and obturation) were done in single visit in about 50-60 mins. Subgroup B1: 46 teeth were instrumentation (step-back) carried out using hand-held stainless steel k-files and obturated with

laterally condensed gutta-perch cones and eugenol based sealer.

Subgroup B2: 42 teeth were the canals prepared by Protaper nickel-titanium rotary instruments with aid of X-smart machine and obturated was carried out using laterally condensed gutta-percha cones and eugenol based sealer.

Each patient was given an evaluation sheet and visual-analogue pain scale was explained (table 1), and requested to record the level of pain 48 hours (2 days), and 7th days after completion of endodontic treatment. The entire patient talked to not take any medication and putted on call till pain reach to sever one then talked to take (Amoxicillin 500 mg or/ Erythromycin 500mg for patients sensitive to Penicillin and Ibuprofen 400 mg) to distinguish between sever pain and flare up were the last one not affected by medication. The three pain categories and flare up were as follows^{6,15}:

0= No pain

1= Slight pain: any discomfort no mater how brief in duration that did not require medication and that did not impair masticatory function in any way.

2=Moderate/Sever pain: requiring medication or other palliative treatment, impairment of masticatory function (discomfort in chewing).

3= Flare-up: either patient's report of pain not controlled with over the counter medication and or increasing swelling.

Data were collected and recorded for statistical analysis using Chi-square test.

Results

Incidence of postoperative pain in one-and multiple-visits: Statistical

analysis of the results using Chi-square (χ^2) showed that there were no significant differences in postoperative pain between one visit and multiple visits after 2 and 7th days (table 2), also there was no significant difference in flare up between one visit and multiple visits (P-value >0.05) (table 3).

Incidence of postoperative pain in conventional step-back and ProTaper rotary system: patients who received root canal treatment using conventional step-back technique reported a significantly higher incidence of postoperative pain after 2 days compared to ProTaper system in both one- and multiple visits. After 7 days, the incidence of postoperative pain also higher in conventional step-back technique than ProTaper but non significant (table 4 and 5).

Discussion

The results of our clinical study reported no statistically differences in the expression of post-operative pain and flare-up between one visit and multiple visits. This result was in contrast with the finding Oginni and Udoye⁶ who reported higher incidences of post-operative pain and flare-up following single visit than multiple visits, were the patients do not present for endodontic treatment before the onset of sever pain while in our study the selection of patient comes with a symptomatic vital pulp. This finding was supported by previous studies¹⁶⁻¹⁸ that had shown a positive correlation between pre-operative and post-obturation pain.

The result of this study also can be due to vital teeth selection, this mean the infection is limited to the superficial portions of the tissue, while the larger portion is not infected. This means that the primary focus of endodontic procedure is to prevent microbial infection of the root canal

space, therefore; pulp extirpation and placement of wound dressing-the root canal filling - are best completed in a one visit if aseptic conditions are to maintained.¹⁹

In both one visit and multiple visits, cases instrumented with step back technique using hand-held stainless steel K-file had higher incidence of post operative pain than cases instrumented with ProTaper rotary system. This result can be explained by step back technique produced more apically extruded debris than engine driven nickel-titanium rotary instrumentation technique²⁰. The hypotheses that engine driven rotary nickel-titanium instruments produce less debris, was supported by Sarina and Hicks²¹, they suggested that instrumentation techniques involving rotational movement and the light speed decreases the amount of debris forced apically thus leading to a decreased potential for peri-radicular tissue irritation and postoperative pain. On the other hand, with stainless steel k-files, debris was jammed in the canal or pushed toward apex.

It is important to understand the fundamentals and principles of endodontics before putting single visit endodontics as a first choice. All the indications and contraindications in each case on an individual basis should be considered in decision-making whether or not it can be completed in a single visit. However, one-visit endodontics can be successfully performed if well-skilled clinicians choose their cases carefully and adhere to basic endodontic principles.

Conclusions

Within the limitation of this clinical study, no significant differences in post operative pain and flare-ups between teeth that were endodontically treated in one visit and multiple visits. Also

root canal treatment using modern techniques of root canal cleaning, shaping can be considered as a viable method for the retention of natural teeth within contemporary treatment planning concepts.

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Table 1: Data collection form and visual analogue pain scale

Name:.....Sex:.....Age:.....

A- Systemic disease:.....yes.....no If yes, what.....

B- Allergy:.....yes.....no If yes, what.....

C- Are you taking any medication within 30 days:.....yes.....no

If yes, what.....

<u>Time intervals</u>	<u>none</u>	<u>slight</u>	<u>moderate/sever</u>	<u>Flare-up</u>
Preoperative day	0	1	2	3
After 48 hrs	0	1	2	3
After 7 days	0	1	2	3

* I agreed to participate in this study according to the type of treatment.

Signature

Table 2: Pain incidence after 2 and 7 days.

group	Pain incidence							
	No pain	%	Slight	%	Mod/Sever	%	Total	%
One visit	76	86.4	8	9.1	4	4.5	88	100
Multiple visits	75	84.3	12	13.5	2	2.2	89	100
χ^2 /2 days	$\chi^2 = 1.47$, P-value= 0.48 (NS)							
One visit	82	93.2	4	4.5	2	3.2	88	100
Multiple visits	83	93.3	5	5.6	1	1.1	89	100
χ^2 /7 days	$\chi^2 = 0.44$, P-value= 0.8 (NS)							

Table 3: incidence of Flare up.

group	No Flare up	%	Flare up	%	total	%
One visit	87	98.9	1	1.1	88	100
Multiple visits	88	98.9	1	1.1	89	100
χ^2	$\chi^2 = 0.49$, P-value= 0.482 (NS)					

Table 4: Pain incidence after 2 and 7 days in one visit endodontic.

group	Pain incidence							
	No pain	%	Slight	%	Mod/Sever	%	Total	%
conventional	35	76.1	8	17.4	3	6.5	46	100
Pro Taper	41	97.6	0		1	2.4	42	100
χ^2 /2 days	$\chi^2 = 9.3$, P-value= 0.0095 (S)							
conventional	41	89.1	4	8.7	1	2.2	46	100
Pro Taper	41	97.6	0		1	2.4	42	100
χ^2 /7 days	$\chi^2 = 3.8$, P-value= 0.14 (NS)							

Table 5: Pain incidence after 2 and 7 days in multiple visits endodontics.

group	Pain incidence							
	No pain	%	Slight	%	Mod/Sever	%	Total	%
conventional	36	76.6	10	21.3	1	2.1	47	100
Pro Taper	40	95.2	2	4.8	0		42	100
χ^2 /2 days	$\chi^2 = 6.2$, P-value= 0.043 (S)							
conventional	41	87.2	5	10.7	1	2.1	47	100
Pro Taper	42	100	0		0		42	100
χ^2 /7 days	$\chi^2 = 5.74$, P-value= 0.056 (NS)							