

## Comparison of Flare up Incidence in Patients Treated by Different Practitioners

Sedigh Shamsi M.<sup>a</sup>, Moazami F.<sup>a</sup>, Sahebi S.<sup>a</sup>, Vahabi P.<sup>b</sup>

<sup>a</sup> Dept. of Endodontics, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, IRAN

<sup>b</sup> General Practitioner

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### ABSTRACT

**Statement of Problem:** Flare up is an acute exacerbation of an asymptomatic pulpal and/or periapical pathosis after commencement or termination of root canal therapy. Its incidence may be different in patients treated by different practitioners regarding their graduation status.

**Purpose:** The aim of this study was to compare flare up incidence in patients treated by dental students of Shiraz Dental School and those whom were treated by endodontists.

**Materials and Method:** Patients' information including age, gender, and previous history of pain and pulp vitality were taken before treatment of 383 patients. 230 of them were treated by senior dental students of Shiraz Dental School and 153 of them were treated by endodontists. Students employed conventional step back technique whereas specialists had a chance to select variety of techniques. Data, regarding the quantity of pain experienced by patients were collected 48 hours after treatment. Case was considered a flare up if the patient had experienced severe pain which hadn't been reduced either by analgesic medication or by consequent swelling. Chi-square statistic tests were used to analyze the receiving data.

**Results:** 41 individuals (10.7%) out of 383 patients depicted flare up. 13.5% of these patients were treated by students and 6.5% were treated by endodontists. The difference was statistically significant.

**Conclusion:** Different rate of flare up in two groups is probably due to the dissimilarity in skills, techniques and materials used by different operators.

**Corresponding Author:** Sedigh Shamsi M. Dept. of Endodontics, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, IRAN Tel: +98-0711-6263193-4 Fax: +98-0711-6270325 Email: mahdi.sedigh@yahoo.com

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### Introduction

American Association of Endodontics (AAE) delineates endodontic flare up as an acute exacerbation of an asymptomatic pulpal and/or periapical pathosis after commencement or termination of root canal therapy [1].

A wide range of its prevalence in dissimilar studies was reported as low as 0.39% [2], to as high as 20% [3]. This can be explained by different temperament of flare up.

Some researchers describe it as pain and/or swelling that requires active interference by a dentist [4] while others prefer to use a quantitative method with index questioners to describe this phenomenon [5]. There is also an inherent potential source of heterogene-

ity in these kinds of studies such as clinical factors (dissimilarities in the participants and interventions), methodological elements (variability in trial models and quality measurements) and statistical issues (various treatment effects being assessed in the variable trials) [6]. A meta-analysis study evaluating the data of 119 studies expressed that incidence of flare up was 8.4% [7].

Mechanical, chemical and microbial factors are involved in pathogenesis of flare up. Siqueira et al. stated that pushing microorganisms beyond the apex is the most significant cause [8-9].

Other researchers found preoperative pain, anxiety, type of intracanal medicine and size of apical lesion

as causative factors affecting the rate of flare ups [2, 4, 10-13].

Another factor that can influence post-operative pain is the graduation status of the operator. There is one study which evaluated and compared the incidence of flare up in patients treated by different practitioners. This study revealed that specialists face more flare ups after treatment in contrast to under graduated students [4]. This study was done in 1992, when new instruments and techniques were not introduced to endodontic clinicians. According to changes in definitions, concepts and materials in endodontics, new study in this field seems to be necessary.

The aim of this study is to compare the prevalence of flare up in these two types of practitioners.

**Materials and Method**

A total of 383 subjects including 230 patients admitted in dental school of Shiraz university and 153 patients treated in a private endodontic clinic participated in this study which lasted for six months. Participants with irreversible pulpitis or pulp necrosis that needed primary endodontic treatment and had no history of systemic complications particularly allergies were recruited in the study. Subjects who were taking analgesic and/ or antibiotic were excluded from the study. Patients were assured that accepted endodontic therapy procedure with no new material or technique is performed. Written informed consent was obtained from patients or their parents when the case was a child. The subjects' preoperative pain status (classified as present or absent), their age and gender, number of their treatment sections (one-visit or two- visit) were recorded in the data sheet. The standard protocol was in concern and patient preparations have been done in accustomed form.

In group which were treated by students, working length was determined by periapical radiographies and step back technique was applied for canal preparation with 1.0mm shorter than imaged radiographic apex.

Specialists were free to choose either apex locator or radiography to measure the working length as well as preparation technique. Irrigation with 2.5% sodium hypochlorite followed by normal saline, after instrumentation, was performed in both groups.

The canals in both groups were filled with gutta-percha (Aria Dent, Iran) and AH26 sealer (DENTSPLY,

Konstanz, Germany) using lateral condensation technique. Intra canal calcium Hydroxide dressing was applied in two- visit cases for at least 7 days.

Patients were prescribed to take a post operative 400mg Ibuprofen and 625mg acetaminophen each 6 hours when necessary. In case of intolerable pain with or without swelling, patients were instructed to revisit clinic or office to have emergency treatment. Forty eight hours after each appointment, patients were asked about the intensity of any post operative pain (if existed) on telephone call by one person. The intensity of pain has reported by the patients was categorized in to four levels:

1. No pain.
2. Mild pain: recognizable but not discomforting pain which does not require analgesics.
3. Moderate pain: discomforting but bearable pain (analgesic was useful when taken)
4. Severe pain: hard to tolerate

Subjects who were suffering from the fourth grade of pain were considered as flare up. Confining variables including necrosis of tooth and pre-operative pain was controlled using logistic regression statistic test and T-test was used to compare the rate of flare up in two groups.

**Results**

383 subjects (230 treated by students and 153 treated by specialists) whose ages ranged from 12 to 63 years were evaluated in this study. Their mean age was 30.8.

31% and 39% of teeth treated by students and specialists were symptomatic respectively. 36% of teeth treated by students and 39% of teeth treated by specialists were not vital.

The amount of overall flare up was 41 (10.7%). Data showed that 10 patients from the specialist group (6.5%) and 31patients from the student group (13.5%) reported fourth grade of pain. The difference was significant ( $p= 0.012$ ) (OR=2.91, 95% CI: 1.27-6.67) (Table 1).

**Table 1** The relationship of flare up and operator type

	Type of practitioner	Student (%)	Specialist
<b>Flare up</b>			
Absent		199 (86.5)	143 (93.5)
Present		31 (13.5)	10 (6.5)

In the student group, flare ups occurred most often in patients with existing preoperative pain and showed a significant difference ( $p < 0.01$ ). Teeth with preoperative pain encountered with more percentage of flare ups than symptomless teeth in specialist group, though the difference was not significant (Table 2) ( $p = 0.52 > 0.05$ ).

**Table 2** The relationship of flare up and pre-operative pain

Flare up	Student group		Specialist group	
	Pre-operative pain		Pre-operative pain	
	Absent	Present (%)	Absent (%)	Present (%)
Absent	51 (70.9)	148 (93.7)	87 (94.6)	56 (91.9)
Present	10 (6.3)	21 (29.1)	5 (5.4)	5 (8.1)
P-value	0.00		0.52	

Teeth with necrotic pulps had more incident of flare up than those with vital pulps in student group with a statistically significant difference ( $p = 0.04 < 0.05$ ). However, There was no significant difference in flare up occurrence for teeth treated by specialists between vital and non-vital pulp (Table 3) ( $p = 0.74 > 0.05$ ).

There was no significant difference between men and women in flare up occurrence in student and specialist groups ( $p = 0.43$  and  $p = 0.33$  respectively)

**Table 3** The relationship of flare up and pulp condition

Flare up	Student group		Specialist group	
	Pulp condition		Pulp condition	
	Vital (%)	Non vital (%)	Vital (%)	Non vital (%)
Absent	131 (90.3)	68 (80)	85 (92.4)	58 (95.1)
Present	14 (9.6)	17 (20)	7 (7.6)	3 (4.9)
P-value	0.04		0.74	

## Discussion

The issue of “flare up” has always been in the focus of attention in researches since it has been construed to have many predisposing factors such as pre-treatment pain, existence of periapical lesions, number of treatment appointments and pulp status [11-14].

The aim of this clinical study was to evaluate the rate of post-treatment flare ups in patients treated by different practitioners with different skills and armamentarium.

For many patients flare up is an unpleasant experience which brings scepticism about their dentist

skills. Root canal therapies with less flare ups, brings less post operative efforts and cost for both clinician and patient. Moreover, in a prospective study it has also been reported that in the absence of flare-up, periapical healing is significantly enhanced [15]. There are two acceptable methods for measuring pain [9, 5, 17-18]. The visual analogue scale (VAS) was regarded as a valid and reliable ratio scale for measuring pain. However individual reaction to perceived sensation or pain behaviour is a part of pain perception that can influence the results and requires explanation to the patient. We used simpler rating method that had only 4 levels of discomfort assessed by easy-to-teach and understandable questions for the patients and its efficacy is confirmed in other study [13].

Walton et al. found patients treated by faculty and post graduate students had significantly more post-operative pain than the undergraduate students [4]. They explained that this difference may be due to high referral rate of emergencies cases to the faculty group. Many of these emergencies include symptomatic apical periodontitis with necrotic pulps which can produce more flare ups according to many studies [5, 2, 8, 11-12].

In contrast to Walton study's results, students encountered more flare ups than specialists in our study. Students were limited to use only radiography to measure working length; specialists could use electronic apex locators in addition to radiography which apparently increases the accuracy of working length determination [19]. So risk of over instrumentation and mechanical injury, a factor predisposing subjects to flare up [8] is lesser.

Students were limited to apply conventional step back technique working with stain less steel K-files. Whereas specialist could select variety of techniques including engine-driven rotary nickel-titanium instrumentation and crown down instrumentation that are associated with less apical debris extrusion [20-22]. This dentinal debris can be contaminated with microorganism. According to Siqueira et al., pushing microorganisms beyond the apex is a main cause of flare up [8].

In a study enrolled by Tanalp J et al. in which subjects were treated by specialists using a type of rotary system, the incidence of real flare ups that needed immediate appointments were reported to be as low as 3.4% [23].

The results of the present study suggest that compared to specialist group; symptomatic teeth were more implicated with flare ups in student group. Similarly, Genet et al. found that subject with pre-operative pain had more percentage of flare up than those without pre-operative pain [12].

Torabinejad et al. noted that pre-operative pain is a prognostic factor for flare up [11]. Symptomatic teeth have higher concentration of molecular mediators of inflammation [24].

These mediator decrease firing threshold of pain so that previously non-noxious or noxious stimuli (e.g. introducing endodontic instruments, irrigates or materials) could be perceived painful or more painful [24]. In the same line, Yu et al. reported that pre-operative pain was significantly in relation with post-treatment pain in a study enrolled by 127 patients with 185 persistent lesions.

Contrary to our study, Siqueira et al. found flare up incidence as low as 1.2% when root canal therapy was done by undergraduate students that were in first year of training [8]. To be noted that they enlarged the coronal two-third of canals with GatesGlidden burs before preparing canals with conventional step back technique. Walton et al. found that teeth with necrotic pulp are more prone to endodontic flare ups [4]. Torabinejad et al. also considered that endodontic inter appointment emergency was strongly related to pulp status as a predisposing factor [11].

In our study, pulp status had a substantial effect on prevalence of flare up in student group. The flare up incidence did not differ significantly in vital and non vital teeth treated by endodontists. This dissimilarity may be due to difference in skills, instruments and techniques used for two groups.

In none of two groups, gender had significant effect on endodontic flare up. This confirms the results of Tsesis et al. [7] and Alnegrish [25].

Beyond the limitations of this study, the subject of "flare up" can always be a controversial issue to be investigated in future regarding its predisposing factors, the factors that have been claimed, in another study, to have no effect on its incidence [26].

## Conclusion

Students encountered more flare up than specialist. Dif-

ferent rate of flare up can be due to the difference in skills, techniques and materials used by different practitioners. Pre-operative pain and pulp status is two important predicting factors for flare up especially in patients treated by under graduate students.

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