

*Full Length Research Paper*

# Flare-up incidence and related factors in adults

Udoye Christopher\* and Aguwa Emmanuel

<sup>1</sup>Department of Restorative Dentistry, Faculty of Dentistry, University of Nigeria, Nsukka, Nigeria.

<sup>2</sup>Department of Community Medicine, Faculty of Medical Sciences, University of Nigeria, Nsukka, Nigeria.

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**The study determined the incidence of flare-up and the effect of visit type, treatment duration, pre-operative pain, etc. on flare-up in adults. One hundred and seventy five participants, aged 18 to 60 years with a necrotic central incisor, with or without pre operative pain, participated in the study. They received post operative paracetamol tablets and were asked to report back if unbearable pain/swelling developed. A 10% flare up rate was recorded, while none of the studied factors had a significant relationship with flare-up, except intra operative pain.**

**Key words:** Flare-up, preoperative pain, treatment duration, visit type.

## INTRODUCTION

Many definitions of flare up exist in the literature and each appears to be influenced by case definitions. For the purposes of this study and for it to be more clinically useful, a flare-up is defined as a pain and/or swelling which occurs a few hours to seven days after initiation or continuation of root canal therapy (RCT), which cannot be relieved by paracetamol and for which the patient reports to the clinic for active treatment. The primary aim of RCT is to biomechanically prepare the canal with minimal or no discomfort and to hermetically seal it to aid recovery of insulted periapical tissues and to prevent post operative pain (flare-up).

Depending on the study design, flare-up incident rate ranges from 1.58 to 90% (Houck et al., 2000; Imura and Zuolo, 1995). Igbal et al., 2009 are of the view that in the absence of any gold standard, and because of the variable definitions, comparison of flare-up incidence across studies is challenging. Pickenpaugh et al. (2001) reported age and gender, use of antibiotics and analgesics, pulpal status, pre-operative pain, as well as periapical radiolucency as flare-up factors. However, RCT can be a one or two visit procedure. Sathorn et al. (2008) reported visit type as a flare up risk factor.

Though the attempt to complete RCT in one visit had

been in practice since the late 19<sup>th</sup> century, in which one versus multiple visit RCT remains a subject of debate among dentists (Bergenholtz and Spangberg, 2004). Some patients regard the latter type of RCT as a safer procedure than the former type (Grossman et al., 1988). In his study, Oliet (1983) found no significant difference between the results of the two RCT visit methods. On the other hand, Oginni and Udoye (2004) reported a significantly higher flare-up incidence in one visit over a multiple visit RCT, while other reports (Eleazer and Eleazer, 1998; Albashireh et al., 1998) made findings opposite to that of the latter. However, Al-Negrish and Hababbeh's (2006) sample contained no teeth with pre-operative pain.

O'Keefe (1976) found that a relationship between pre- and post-operative pain levels exists. Elaborating further, Genet et al. (1987) reported that 65% of patients with preoperative pain had post operative pain, while only 23% of patients with preoperative pain had no flare-up. The effect of gender was not investigated by Genet et al. (1987). However, Jariwale (2001) found that females experienced more pain and flare ups than males.

A review of the literature failed to reveal studies that highlight the effects of age, treatment duration and intra-operative pain on flare-up incidence. It is believed that properly identified flare ups risk factors will help in better patient management and improved outcome. The purpose of the study was to determine the incidence of flare-up in the adult subjects attending private endodontic clinics and to investigate the effect of age and gender,

\*Corresponding author. E-mail: [udoye432@yahoo.co.uk](mailto:udoye432@yahoo.co.uk). Tel: 2348037519722.

treatment duration, preoperative pain, visit type and intra operative pain on flare up.

## MATERIALS AND METHODS

One hundred and seventy five consecutively recruited adults aged 18 to 60 years, who attended private endodontic clinics participated in the study that lasted four months. Consentees presenting a symptomatic or asymptomatic necrotic upper central incisor with no radiographic periapical pathology were recruited in the study. Other inclusion criteria were negative test to electric pulp test (EPT) and lack of bleeding from the pulp chamber when opened.

On the other hand, teeth that were either tender to percussion (TTP) or massively calcified intracranally were excluded in the study. Others were immature teeth, teeth associated with sinus formatinor or any other form of morphological abnormalities. Also, subjects on either analgesics in the last 24 h or on antibiotics in the last one month were excluded from the study.

Subjects were randomly assigned to either one visit or two visit group. The age and gender of subjects, visit type (one or two visit), pre-operative pain status (present or absent), treatment duration (in minutes) and intra operative pain (present or absent) were recorded in the data sheet.

Following a standard protocol, the subjects were prepared in the usual way. A step back technique was used to prepare the canal and the working length was determined with a periapical radiograph (paralleling method), which was 1.0 mm short of the radiographic apex. A 2.5% sodium hypochlorite solution was used as irrigants, followed by normal saline, after instrumentation of each.

The canals in both visit groups were filled with gutta percha, using lateral condensation method, with AH<sub>26</sub> as sealer (Dentsply, Konstanz, Germany). However, for the two visit cases, non-setting calcium hydroxide (intracranally) was used as an inter appointment dressing. This was retained intracranally for seven days. Fifteen subjects were disqualified from the final filling in the two visit group if they had any or all of the following: failure to produce clean dentine shavings during intracanal instrumentation, uncomfortable teeth, weeping canal, etc.

For the purposes of this study, treatment duration for the one visit group was measured from the time the pulp chamber was opened to when the access cavity was sealed. On the other hand, the treatment duration for the two visit group was the sum (in minutes) of the following: the time taken to open the pulp chamber to when access cavity was temporarily sealed during the first visit and the time taken to remove the access filling to when the final restoration of the access cavity was placed at the second visit appointment.

Subjects were asked to take a post operative prescription of 1000 mg paracetamol tablets when necessary. The subjects were instructed to return to the clinic for active treatment if they experienced unbearable pain and/or swelling.

The data were analyzed with SPSS for Windows and version 6 Chi square test ( $X^2$ ) was used to assess the independence of categorical variables. The critical significance was set at  $p \leq 0.05$ , while the confidence interval was 95%.

## RESULTS

One hundred and sixty subjects (96 or 60% females and 64 or 40% males) whose ages ranged from 18 to 58 years were studied. Their mean age was  $29.58 \pm 10.12$  and the treatment duration ranged from 35 to 98 min, while the mean treatment duration was  $60 \pm 18.67$  min.

The incidence of flare-up in the population was 16 (10%). The two visit RCT group flared up most often than

the one visit RCT group, though the difference was not statistically significant ( $p = 0.752$ ). Similarly, flare-up occurred most often in subjects with preoperative pain ( $p = 0.268$ ). Teeth flared up most often in the 18 - 20 year age band, while in the 51 to 60 year age band, no teeth flared up ( $p = 0.279$ ) (Table 1).

The teeth with intra operative pain flared up most often than those that had no intra operative pain ( $p = 0.016$ ). Similarly, teeth flared up most often in females than in males, though the difference was not significant ( $p = 0.747$ ) (Table 2).

## DISCUSSION

Every research is limited in one way or the other and the present one is by no means an exception. As a cross sectional study, the study lacks the ability to establish temporal relationships. Furthermore, as noted by Bromm (1984), pre and post operative pains are inherently subjective and therefore unquantifiable. As a result, their diagnosis is based on the subject's report.

The importance of the study of flare-up incidence lies in its use as a bench mark against which the operator's skill can be measured. This is the reason why RCT with lower or no flare up should be the treatment of choice, as far as effectiveness and cost are uncompromised. The current study's report of 10% flare up incidence can be compared favourably with those of the Alacam et al. (1985) and Pickenpaugh et al. (2001), but not with those of Abbott et al. (1988) and Houck et al. (2000). Alacam et al. (1985) studied flare-ups in teeth with both vital and necrotic pulp, while Pickenpaugh's sample consisted of asymptomatic necrotic teeth with periapical radiolucency. Contrastingly, 90% of the subjects, whose teeth were symptomatic and necrotic with apical radiolucency, in Houck et al's study, experienced significant pain. It is noteworthy that preoperative pain was present in all these studies, in which the authors (Torobinejad et al., 1994) agree that it is a prognostic factor and a predilector of flare-up. However, it is difficult to compare flare up incident rates across studies as flare up diagnosis varies across studies, because both sample populations and case definitions differ.

Existing literature on one and two visits RCT gives conflicting opinions and recommendations. Though statistically insignificant, the occurrence of more flare ups in the two visit RCT than in the one visit RCT in the present study agrees with the reports of Eleazer and Eleazer (1998) and Albashireh and Al Negrish (2006), but not with those of Oginni and Udoye (2004) and Peters (1980). On the other hand, Oliet (1983) found no significant difference in post operative pain when comparing one-visit versus multi-visit RCT procedures. However, his finding conforms to other reports (Fava, 1991; Soltanoff, 1978). Oliet (1983) was of the view that the prerequisites for a better outcome are proper diagnosis, good case selection and skilled treatment.

**Table 1.** Flare-up by visit type, pre-operative pain and age.

| Flare up  | Visit type one             |           | Preoperative pain         |         | Age                       |         |         |         |         |
|-----------|----------------------------|-----------|---------------------------|---------|---------------------------|---------|---------|---------|---------|
|           | One visit                  | Two visit | Absent                    | Present | 18 - 20                   | 20 - 30 | 31 - 40 | 41 - 50 | 51 - 60 |
| Absent    | 69                         | 76        | 75                        | 69      | 36                        | 52      | 33      | 16      | 7       |
| Present   | 7                          | 9         | 6                         | 69      | 6                         | 4       | 2       | 4       | 0       |
| P – value | $X^2 = 0.10$<br>Ps = 0.752 |           | $X^2 = 0.10$<br>P = 0.752 |         | $X^2 = 5.08$<br>P = 0.279 |         |         |         |         |

**Table 2.** Flare-up by intra operative pain, mean treatment duration and gender.

| Flare up  | Intra operative pain      |         | Mean treatment duration<br>(in minutes) | Gender                    |      |
|-----------|---------------------------|---------|---|---------------------------|------|
|           | Pain                      | No pain |   | Female                    | Male |
| Absent    | 69                        | 76      | 58 ± 16.752                             | 87                        | 57   |
| Present   | 7                         | 9       | 61 ± 17.324                             | 9                         | 7    |
| P – value | $X^2 = 5.83$<br>P = 0.016 |         | $X^2 = 11.62$<br>P = 0.167              | $X^2 = 0.10$<br>P = 0.747 |      |

The present study is similar to that of O'keefe (1976) where teeth with preoperative pain flared up most often than those with no preoperative pain. Furthermore, Genet et al. (1987) found that 65% of patients with preoperative pain had post operative pain, while only 23% of those with no preoperative pain had post operative pain. Torabinejad et al. (1994) stated that the preoperative pain is a prognostic flare up factor, and its importance lies in the fact that its persistence post-operatively may be a sign of an improving condition if the severity is reduced.

Though statistically insignificant, the presence of more flare up in the 18 to 20 year age band may be due to the fact that most subjects with preoperative pain might have been captured in this age band. Alternatively, it may be that the physiological and anatomical make-up in this age band is in sympathy with the development of flare up.

The difference between the presence of intraoperative pain and development of flare up is statistically significant in the present study, yet the relationship remains uninvestigated in the dental literature. The possible causes of intra operative pain are over instrumentation and injury to periapical tissues, preexisting irreversible pulpitis, periapical periodontitis, as well as failed local anaesthesia. Most of these factors are known flare up predictors. Though both age and gender are not statistically significant flare up risk factors in the present study, the findings of more flare ups in females than in males agrees with the report of Jariwale (2001). The reason may be constitutional or physiological. Furthermore, Liddell and Locker (1997) reported an actual reduction of pain thresholds in women.

**Conclusion**

Except for intra operative pain, the relationships between

flare ups and the studied related factors were not proven. It is recommended that intra operative pain versus flare-up be further investigated.

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