



## Assessment of the Incidence of Posttreatment Endodontic Flare-ups in Patients undergoing Single-sitting Root Canal Therapies: A Clinical Study

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### ABSTRACT

**Introduction:** Endodontic therapy is one of the commonly used procedures for treating the teeth affected by various pathologies. One of the major problems for endodontists despite the advancements in the root canal procedures is the posttreatment endodontic flare-ups. Much debate exists regarding the completion of endodontic therapy in a single sitting or multiple sittings. Hence, we assessed the incidence of endodontic flare-ups in patients undergoing single-sitting root canal therapies.

**Materials and methods:** The present study included 200 patients who underwent single-sitting endodontic therapy. Clinical details and conditions of each and every tooth of every patient were recorded before and after the completion of endodontic therapy. Irrigation during the root canal procedures was done by 2.5% NaOCl solution in most of the cases while others were irrigated with various combinations of ethylenediaminetetraacetic acid (EDTA) and cycloheximide (CHX) solutions. Follow-up records and readings of the patients were noted and were subjected to statistical analysis.

**Results:** Four groups were formed which divided the patients equally on the basis of their age. Out of 50 patients in the age

group of 21 to 30 years, only 4 showed posttreatment endodontic flare-ups, while no endodontic flare-up was recorded in patients with age group of 31 to 50 years. Only two male and four females showed flare-ups postoperatively. A nonsignificant correlation was obtained when flare-up cases were compared on the basis of type of irrigation solution used during canal preparation.

**Conclusion:** Single-sitting endodontic therapy appears to be a successful procedure with good prognosis and minimal posttreatment flare-up results, even in patients with periapical pathologies.

**Clinical significance:** Single-sitting root canal procedures can be successfully carried in patients with vital or nonvital pulp tissues and also in patients with periapical lesions.

**Keywords:** Endodontic, Flare-up, Single sitting.

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### INTRODUCTION

For the preservation for the tooth affected with pathologies, endodontic therapy is one of the routinely employed procedures which seals the pulp canal three dimensionally without creating any discomfort to the patients postoperatively and promote healing of the periapical tissues.<sup>1,2</sup> Flare-up remains one of the major problem for endodontists despite the advancements in the root canal procedures and introduction of rotary systems. Endodontic flare-ups are the conditions characterized by acute exacerbation of pulp or periapical pathologies after commencement of root canal therapy.<sup>3</sup> Severe pain, swelling, or both within a small passage of time after completion of root canal therapy

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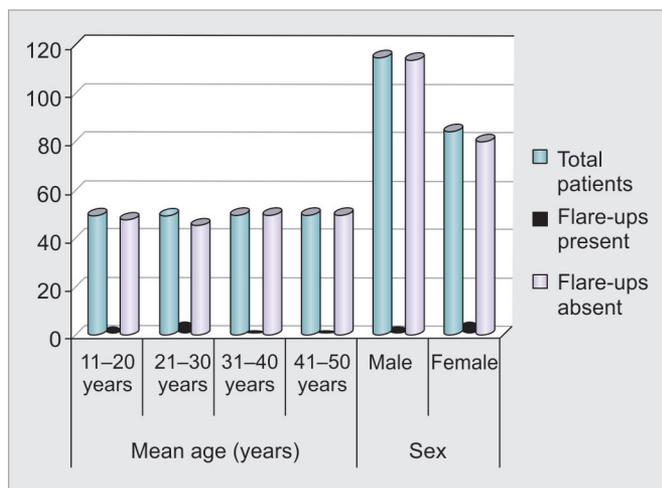
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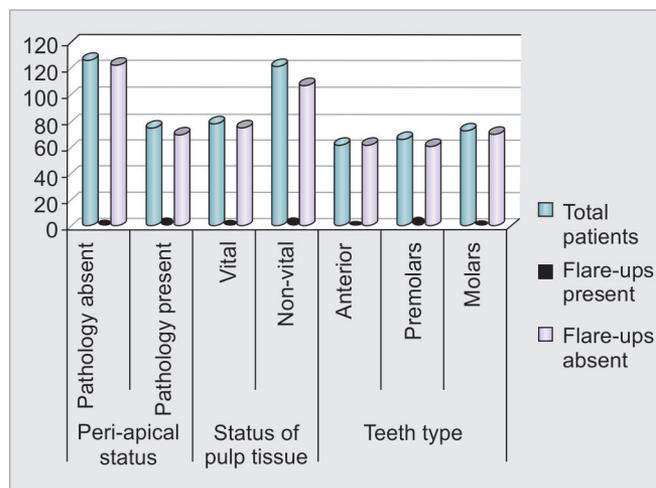
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**Graph 1:** Demographic details of the patients undergoing single-sitting endodontic therapy



**Graph 2:** Clinical details of the patients undergoing single-sitting endodontic therapy

characterize the endodontic flare-ups.<sup>4,5</sup> Much debate exists regarding the completion of endodontic therapy in a single sitting or multiple sittings. Hence, we assessed the incidence of endodontic flare-ups in patients undergoing single-sitting root canal therapies.

**MATERIALS AND METHODS**

The present study was conducted at the department of conservative dentistry of the institution and included 200 patients who underwent single-sitting root canal therapy from May 2011 to June 2012. Ethical clearance was taken from the institutional ethical committee after explaining them the entire study protocol. Written consent was also obtained from each and every patient who underwent single-sitting endodontic therapy and was included in the present study. Single-sitting root canal therapy was assigned to all the patients in the present study irrespective of their clinical and demographic details. Recording of the clinical details and conditions of each and every tooth which underwent treatment was done before and after the completion of endodontic therapy. Patients’ age, sex, tooth type, periapical status, and status of the pulp were assessed preoperatively, and postoperative follow-up details were noted at 1st, 7th, and 30th day time. Before commencing the root canal treatment, local anesthesia was administered followed by isolation of the tooth with rubber dam. Preparation of the root canals was done using crown-down techniques followed by obturation of the canals with zinc-oxide (ZnO)-based sealers. Irrigation during the root canal procedures was done by 2.5% sodium hypochlorite (NaOCl) solution in most of the cases while others were irrigated with various combinations of ethylenediaminetetraacetic acid (EDTA) and cycloheximide (CHX) solutions. Those patients that reported with pain postoperatively that

was controlled by counter medications were put under the category of endodontic flare-ups. All the results were analyzed by Statistical Package for the Social Sciences (SPSS) software. Chi-square test and Student’s t-test were used for the analysis level of significance, and p-value of less than 0.05 was taken was significant.

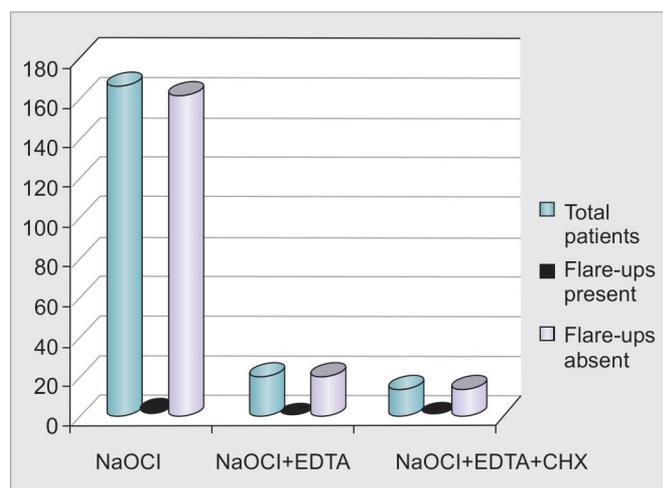
**RESULTS**

Graph 1 highlights the demographic details of the patients undergoing single-sitting endodontic therapy. All the patients were divided into four groups depending upon the age group with 50 patients in each group. Four out of 50 patients in the age group of 21 to 30 years showed posttreatment endodontic flare-ups while two patients showed flare-up in the age group of 11 to 20 years. No endodontic flare-up was seen in patients with age group of 31 to 50 years. Out of 200 patients, 116 were males while the rest were females. Only two male and four female patients showed flare-up postoperatively. In 126 patients, periapical pathologies were absent (Graph 2). Only 4 out of 70 cases with periapical pathologies showed flare-up. A total of 122 cases were with nonvital pulp tissue, out of which only 4 cases showed posttreatment flare-ups. A nonsignificant number of cases showed posttreatment endodontic flare-ups in various groups when divided on the basis of demographic and clinical details (Table 1).

**Table 1:** p-value for the patients with and without posttreatment flare-ups

Parameters	p-value
Mean age (years)	0.812 NS
Sex	0.417 NS
Periapical status	0.682 NS
Status of pulp tissue	0.583 NS
Teeth type	0.097 NS

NS: Nonsignificant



**Graph 3:** Distribution patients undergoing single-sitting endodontic therapy according to different irrigation protocols

**Table 2:** p-value for the patients undergoing single-sitting endodontic therapy with and without posttreatment flare-up according to different irrigation protocols

Irrigation protocol	p-value
NaOCl	0.182 NS
NaOCl + EDTA	
NaOCl + EDTA + CHX	

NS: Nonsignificant

Graph 3 shows the distribution patients undergoing single-sitting endodontic therapy according to different irrigation protocols. Sodium hypochlorite (NaOCl) was the most commonly used irrigant in most of the cases. Only cases in NaOCl group showed postobturation flare-ups. When compared statistically, nonsignificant number of cases showed flare-up in posttreatment phase when divided on the basis of type of irrigation solution used during canal preparation (Table 2).

## DISCUSSION

Multiple-sitting root canal therapy was a preferred line of treatment until most recently. Since past years, multivisit concept was a preferred one and was taught with preference in most of the dental schools. It has been only in the recent past that over 70% of the schools in all the geographic areas advocates single-sitting endodontic procedures.<sup>6</sup> Postobturation pain, interappointment pain, and swelling are some of the common problems being encountered by the patients undergoing endodontic therapy. However, in most of the cases, these symptoms are short-term and do not cause significant discomfort. Regarding the incidence and frequency of postobturation pain, a varied list of opinions are quoted in the past literature. Slightly more symptoms and pain have been reported by various authors in single-sitting root canal procedures in comparison with

multiple-sitting procedures in the past.<sup>7,8</sup> While on the contrary, some authors have reported nonsignificant difference in the postoperative pain in between patients undergoing single- and multiple-sitting root canal procedures.<sup>9</sup> Hence, we assessed the postoperative flare-ups in patients undergoing single-sitting endodontic procedure.

We observed that in patients undergoing single-sitting root canal therapy, a significantly lesser amount of flare-ups occurred postoperatively (Table 1). Our results were in correlation with the results of previous authors who also reported similar findings in their studies.<sup>10,11</sup> A very high incidence of endodontic flare-ups has been reported in patients presenting with severe clinical symptoms and in patients who have been on analgesics.<sup>12,13</sup> When evaluated, no statistically significant association could be observed between the vitality status of the pulp and posttreatment pain incidence (Table 2). Our results were in correlation with the results of Imura and Zuolo<sup>12</sup> and Eleazer and Eleazer<sup>10</sup> who reported very little nonsignificant association between postoperative pain and pulp vitality status. Data from the past point out that slight more pain is experienced in cases with vital pulp in comparison with patients having nonvital pulp.<sup>11</sup> As reported by Sjogren et al,<sup>14</sup> regardless of the number of sitting given for completion of endodontic therapy, over 90% of the periradicular lesion showed healing if proper canal preparation and obturation was done. No significant correlation was observed between the type of irrigation solution used and postoperative discomfort (Table 2) which is in association with the results of previous studies.<sup>15,16</sup> Wang et al<sup>17</sup> compared the frequency of posttreatment pain levels after single- or two-sitting endodontic therapy on anterior teeth of the patients with vital pulp tissue. They analyzed 100 patients who were planned for endodontic therapy on anterior permanent teeth with vital pulp tissues. They divided the patients randomly into two equal groups with difference in the obturation techniques used for filling the teeth in the two groups. They observed that no or only slight pain occurred in most of the patients in both groups. From the results, they concluded that no significant difference exists on the incidence and level of pain after single- or two-sitting endodontic therapy. Oginni and Udoye<sup>18</sup> assessed the incidence of postobturation flare-ups after single- and multiple-sitting root canal therapies in a Nigerian teaching hospital. They evaluated data on vitality status of pulp of the patients, their inter-appointments follow-ups, and postobturation pain. They observed that in comparison with the single-visit group, multiple-visit groups showed significant cases of endodontic flare-ups. From the results, they concluded that in patients undergoing single-sitting root canal procedures, higher incidences of postobturation pain occurs. Oginni and

Udoye<sup>19</sup> compared the incidence of endodontic flare-ups in Nigerian patients undergoing single and multiple root canal procedures. From the results, they concluded that in comparison with multiple-sitting root canal procedures, single-sitting endodontic therapy appears to be an effective procedure. Albashaireh and Alnegrish<sup>20</sup> prospectively analyzed the incidence of postoperative pain following single- and multiple-sitting root canal procedures. They recorded the frequency of postoperative pain over a follow-up period of 1 month in over 290 consecutive patients. They observed a significantly higher incidence of posttreatment pain in patients undergoing multiple-sitting endodontic therapies. From the results, they concluded that significant pain occurs in patients undergoing multiple-sitting endodontic treatments. Kalhoro and Mirza<sup>11</sup> evaluated the associated factors and incidence rate of flare-ups in single-sitting root canal procedures. They assessed patients who underwent single-sitting endodontic procedures and observed that out of 100 single-sitting cases, 3 showed flare-ups in post-treatment phase. From the results, they concluded that in terms of endodontic flare-ups, single-sitting endodontic procedures are safe and effective. Yoldas et al<sup>21</sup> assessed the impact of single- or two-sitting endodontic therapies on the postoperative pain in the patients undergoing retreatment. They evaluated 218 patients that required retreatment and observed statistically significant difference between the patients undergoing single- and two-sitting root canal therapy. From the results, they concluded that in the reduction of postoperative pain, two-visit root canal therapy along with intracanal medication is safe and effective.

## CONCLUSION

From the results, we conclude that in terms of endodontic flare-ups, single-sitting endodontic therapy appears to be a safer and effective procedure even in cases with peri-apical pathologies. Further studies are recommended in this field for further establishing the prognostic significance of single-sitting endodontic procedures.

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