

# Frequency of Inter-Appointment Pain in Controlled and Uncontrolled Diabetics

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## ABSTRACT

**Objective:** To compare the frequency of inter-appointment endodontic flare-ups in controlled diabetes mellitus patients with uncontrolled diabetic mellitus.

**Study Design:** Cross sectional comparative study

**Place and Duration of Study:** This study was conducted at the OPD of the 28<sup>th</sup> Military Dental Centre (MDC) from 01 Jan 2016 to 01 Jan 2018.

**Materials and Methods:** Thirty patients with controlled glucose profile and 30 uncontrolled patients were included in the study. After initiation of root canal treatment, they were recalled after the first 24 hours to assess pain.

**Results:** It was observed that 24(80%) uncontrolled diabetic patients exhibited evidence of symptomatic apical periodontitis because of inter-appointment pain as compared to 09(30%) controlled diabetic patients.

**Conclusion:** Incidence of inter-appointment pain was significantly much higher in uncontrolled diabetics as compared to controlled diabetic patients (p-value 0.00). Showing a probable relationship between inter- appointment pain and uncontrolled diabetes.

**Key Words:** Diabetes mellitus, symptomatic apical periodontitis, endodontic, post-operative pain

**Citation of articles:** Khan HH, Shah SI, Shah SA, Afridi RU. Frequency of Inter-Appointment Pain in Controlled and Uncontrolled Diabetics. Med Forum 2018;29(10):18-21.

## INTRODUCTION

The core purpose of endodontic treatment is to manage pulpal and periapical diseases. This purpose is best achieved by the help of mechanical and chemical debridement of the canals for eradication of intraradicular micro-organisms.<sup>1</sup> In literature, various factors are considered to be contributing towards inter-appointment pain (also called “inter-appointment flare-up”). According to the American association of Endodontics, endodontic flare-up is defined as “inter-appointment pain and swelling that requires an unscheduled appointment”. The inter-appointment flare-up is characterized by symptoms of pain, swelling and difficulty in mastication of the tooth with recently performed endodontic treatment. Iatrogenic errors like ledging, perforations, missed canal, separated instrument and inadequate instrumentation and thus debridement may lead to inter-appointment flare-up.<sup>2</sup> In geriatric patients, glucose profile for diabetic patients should be obtained as the uncontrolled diabetes can adversely affect the prognosis of periradicular pathosis, thus increased incidence of flare-up.<sup>3</sup>

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Received: April, 2018;

Accepted: June, 2018

Cytokines' up-regulation and growth factor's down-regulation are considered to be the factors for altered immune cell functions, in diabetic patients. This causes rapid damage of the tissues and retarded tissue repair after inflammation.<sup>4</sup> Literature also states that the incidence of symptomatic apical periodontitis is also greater when glucose profile of diabetes mellitus patient is uncontrolled. Progressive increase in apical radiolucency has also been found even after performing root canal treatment. The inter-appointment flare ups have also been reported to be high in patients with uncontrolled diabetes mellitus.<sup>5</sup>

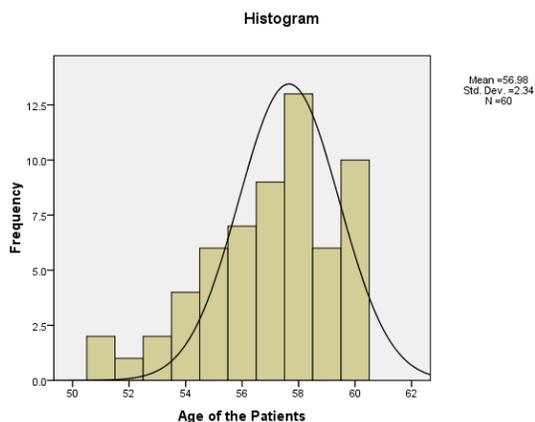
Symptomatic or asymptomatic apical periodontitis is an inflammatory state caused by toxins of micro-organisms within the root canal and into the apical area<sup>6</sup>. Another proposed mechanism behind it is over instrumentation into the apical area during preparation. This will forcefully push infected debris to the apical site and eventually lead to inflammation. Patients either complain of severe pain that is symptomatic apical periodontitis or only in- different feeling of the tooth which is asymptomatic periapical periodontitis.<sup>7</sup>

## MATERIALS AND METHODS

This cross sectional comparative study was carried out at the OPD of the 28<sup>th</sup> Military Dental Centre (MDC) from 01 Jan 2016 to 01 Jan 2018. Approval for this study was taken from the ethical board committee of 28<sup>th</sup> MDC. Then written signed consents were attended from the participants'. A total of 60 subjects were recruited in the study using purposive sampling technique. The subjects were divided into two groups; group A had 30 subjects in the age range of 50 – 60 years, who had controlled diabetes mellitus and

irreversible pulpitis in posterior tooth without periapical radiolucency while group B also had 30 subjects in the same age range with uncontrolled diabetes mellitus and irreversible pulpitis without periapical radiolucency. Subjects who had taken any analgesic or antibiotic for their dental problem in the last 24 hours, teeth with periodontal involvement, and subjects with any other immunological disease or mentally or physically handicapped subjects were excluded from the study. After the participants' were anesthetized with 2% lidocaine, first visit of endodontic treatment was started. Isolation was maintained with the help of rubber dam and Endo-Z burs (Dentsply Maillefer USA) were used for access cavity. Patency of the canals and preparation of the canal system was done with Stainless Steel manual K-files (Maillefer, Ballaigues, Switzerland). Canal flaring was done on the concept of step-back technique. During the preparation 2.5% Sodium Hypochlorite was used for irrigation of the root canals. For the removal of the smear layer Ethylene Diamine Tetra acetic acid (EDTA) was used. In the first visit of endodontic treatment initial instrumentation, preparation and confirmation of the working lengths were taken. Then Calcium Hydroxide was placed as the intra-canal medicament in all participants' with the help of K-files (Maillefer, Ballaigues, Switzerland). The visual analogue scale (VAS) was used to record the level of pain experienced by the patients after 24 hours. The scores of VAS were categorized further for the purpose of descriptions i.e. the patients reporting with score of above three were categorized to be having inter- appointment endodontic pain. While patients below the score of three on the VAS, were categorized as not having inter-appointment endodontic pain cases.

**RESULTS**



**Figure No. 1: Means age of patients**

A total of 60 patients participated in the study. The mean age of the patients in both the groups was 56.98 ± 2.34 (figure 1). The mean age of patients in group A was 57.10 ± 2.264 years while that in group B was 56.87 ± 2.446 years (table 1).

A total of 33 patients presented with inter-appointment pain, in which 24(80%) patients were from group B, i.e. uncontrolled diabetic group and 09(30%) patients from the controlled group (table 2). To assess the significance of the frequency of inter-appointment pain between the two groups, Pearson chi square test was applied showing the p-value of 0.000.

**Table No.1: Mean age of patients in both groups**

	Group A (Controlled Diabetics)	Group B (Uncontrolled Diabetics)
Total Number of patients	30	30
Mean Age	57.10	56.87
Standard Deviation	2.264	2.446
Minimum Age	51	51
Maximum Age	60	60
Range	9	9

**Table No. 2: Number of patients who developed inter-appointment pain in each group**

Diabetic status of patient	Inter appointment pain developed	Inter appointment pain did not develop	Total
Controlled	9	21	30
Uncontrolled	24	6	30
Total	33	27	60

**DISCUSSION**

Diabetes mellitus is not only increasing in incidence here Pakistan but throughout the world it is the same scenario. The significance of controlling this metabolic disease has been highlighted multiple times for desirable medical outcomes. Also it is a known fact that if diabetes mellitus patient's glucose profile is uncontrolled the disease is a challenge for any medical or dental procedure. Again an association with the prognosis of endodontic treatment the control of glucose profile has also been established in literature. Hence it has been suggested that patients should be assessed before hand to evaluate their control of Glucose levels before starting endodontic therapy.<sup>4</sup> Amongst the medically compromised patients pursuing dental treatment, diabetes is the third most prevalent condition,<sup>8</sup> therefore the present study was designed to evaluate the frequency of inter appointment flare ups and apical periodontitis in patients with controlled and uncontrolled diabetes seeking endodontic treatment. The results of the present study showed an increased frequency of inter appointment pain and apical periodontitis in the patients having uncontrolled diabetes (p=0.000) as compared to patients with controlled diabetes. Different studies<sup>9,10,11,12</sup> have reported that there is an association between glucose

level and process of healing in periapical tissues, and the patients having uncontrolled diabetes seeking endodontic treatment have decreased ability for wound repair. A retrospective study done by Fouad et al.<sup>13</sup> showed that in diabetic patients the rate of inter appointment flare-up during endodontic treatment was 8.6% and in nondiabetics it was 2.3%. The authors also concluded that the rate of inter appointment flare-ups was twice in diabetics as compared to nondiabetics. In the present study the rate of inter appointment flare ups was 80% in uncontrolled diabetics and 30% in controlled diabetics. The present study also found that the rate of inter appointment flare ups was three to four times higher in uncontrolled diabetics as compared to controlled diabetic patients. The increased frequency of interappointment flare ups in this study may be due to the inclusion of different age group patients and obtaining the data from electronic records in Fouad et al study<sup>13</sup>.

A study done by Nayantara,<sup>14</sup> on comparative evaluation of interappointment flare-ups in diabetic and nondiabetic patients, had found that in diabetic group, only 5 patients out of 30 developed interappointment flare-up while in non-diabetic group only 2 patients experienced inter-appointment flare-up. While in the present study 24 patients out of 30 in uncontrolled diabetic group and 9 out of 30 in controlled diabetic group had experienced interappointment flare up. The difference between the results may be due to difference in the intracanal medicaments used and number of appointments (three visits) in which the root canal treatment was completed in the their study.

Study done by Swati et al <sup>15</sup> had found that the incidence of interappointment flare ups in diabetic patients was 16% while it is higher in the present study, 80% in uncontrolled diabetics and 30% in controlled diabetics. This difference in the results may be because they only included diabetic patients in their study however in the present study, we compared uncontrolled diabetic and controlled diabetic patients and secondly in their study they compared three different medicaments which may have accounted for difference in the results.

Bender et al.<sup>16</sup> showed that patients having uncontrolled DM tends to develop periapical radiolucencies more readily during endodontic treatment while subjects having controlled DM resulted in healing of periapical lesions. Clinical and radiographic assessment of periapical lesions done by Falk et al.<sup>17</sup> have shown higher prevalence of periapical lesions in type 1 diabetics. They noted that women having long duration DM have higher frequency of periapical lesions associated with root canal filled teeth as compared to women with short duration diabetes and without diabetes.

A multivariate analysis conducted by Fouad & Bursleson<sup>11</sup> showed that there is increase prevalence of

periodontal diseases in root canal treated teeth in patients with diabetes and have higher failure rates of root canal treatment in patients having preoperative periapical lesions. An epidemiologic study carried out on population of native America by Mindiola et al,<sup>18</sup> to figure out different factors that affects the longevity of root canal filled teeth, postulated that the longevity of root canal filled teeth is reduced by diabetes. Another study<sup>10</sup> was conducted in a Brazilian population with type 2 diabetes to find out the prevalence apical periodontitis and endodontic treatment. 60 patients without diabetes and 30 patient with diabetes were included in the study and were assessed using panoramic and retro-alveolar radiographs. They concluded that there was higher prevalence of apical periodontitis in patients having diabetes. The results of the present study are in accordance with all the aforementioned studies.

The drawbacks of this study were that pain was only assessed for the first 24 hours after patients' appointment. Also the uncontrolled diabetic group was not further classified on the bases of blood glucose level. This would have provided an in depth relationship between inter- appointment pain and the blood glucose level of un- controlled diabetic patients.

## CONCLUSION

From this comparative descriptive study, it can be concluded that the frequency of inter- appointment pain is higher in patients with uncontrolled diabetes as compared to controlled. Although there were incidence of inter-appointment pain even in the controlled DM group. The much higher incidence in the uncontrolled DM group for inter-appointment pain, points towards a probable relation between uncontrolled diabetes and inter- appointment pain during root canal treatment.

### Author's Contribution:

Concept & Design of Study:	Hannan Humayun Khan
Drafting:	Syed Imran Shah
Data Analysis:	Shafqat Ali Shah, Rizwan Ullah Afridi
Revisiting Critically:	Hannan Humayun Khan, Syed Imran Shah
Final Approval of version:	Hannan Humayun Khan

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

1. Kandaswamy D, Venkateshbabu N. Root canal irrigants. *J Conservative Dent* 2010;13(4):256-264.
2. Glubivala K. *Endodontics*. 4<sup>th</sup> ed. Oxford: Mosby Elsevier; 2014.
3. Leite M, Ganzerla E, Marques MM, Nicolau J. Diabetes induces metabolic alterations in dental pulp. *J Endod* 2008;34:1211-4.

4. Lamster IB, Borgnakke WS, Taylor GW. The relationship between oral health & Diabetes mellitus. *JADA* 2008;139:19-24.
5. Lima SM, Grisi DC, Kogawa EM, Franco OL, Peixoto VC, Goncalves-Junior JF, et al. Diabetes mellitus and inflammatory pulpal and periapical disease: a review. *Int Endod J* 2013;46(8):700-9.
6. Narayanan LL, Vaishnavi C. Endodontic microbiology. *J Conservative Dent* 2010;13(4):233-239.
7. Souza RA. The Importance of Apical Patency and Cleaning of the Apical Foramen on Root Canal Preparation. *Braz Dent J* 2006;17(1): 6-9.
8. Dhanuthai K, Sappayatosok K, Bijaphala P, Kulvitit S, Sereerat T. Prevalence of medically compromised conditions in dental patients. *Med Oral Patol Oral Cir Bucal* 2009;14:e287–e291.
9. Borges A, Pedro F, Segundo A, Volpato L, Cruz-Filho A, Baratto-Filho F. Tratamento endodôntico de pacientes diabéticos: um relato de caso clínico. *Perspect Oral Sci* 2010;2: 37-42.
10. Marotta P, Fontes T, Armada L, Lima K, Rôças I, Siqueira J. Type 2 diabetes mellitus and the prevalence of apical periodontitis and endodontic treatment in an adult Brazilian population. *J Endod* 2012;38:297-300.
11. Fouad A, Burleson J. The effect of diabetes mellitus on endodontic treatment outcome. Data from an electronic patient record. *J Am Dent Assoc* 2003;134:43-51.
12. Britto L, Katz J, Guelmann M, Heft M. Periradicular radiographic in diabetic and control individuals. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2003;96:449-52.
13. Fouad A, Burleson J. The effect of diabetes mellitus on endodontic treatment outcome. Data from an electronic patient record. *J Am Dent Assoc* 2003;134:43-51.
14. Sen N, Gupta AK, Singh BP, Dhingra A. Comparative evaluation of interappointment flare-ups in diabetic and nondiabetic patients. *Ind J Dent Sci* 2017;9:160-4.
15. Pai S, Vivekananda Pai AR, Thomas MS, Bhat V. Effect of calcium hydroxide and triple antibiotic paste as intracanal medicaments on the incidence of inter-appointment flare-up in diabetic patients: An in vivo study. *J Conservative Dent* 2014; 17(3):208-211.
16. Bender IB, Seltzer S, Freedland J. The relationship of systemic diseases to endodontic failures and treatment procedures. *Oral Surg Oral Med Oral Pathol* 1963;16:1102–1115
17. Falk H, Hugoson A, Thorstensson H. Number of teeth, prevalence of caries and periapical lesions in insulin-dependent diabetics. *Scand J Dent Res* 1989;97:198–206
18. Mindiola MJ, Mickel AK, Sami C, Jones JJ, Lalumandier JA, Nelson SS. Endodontic treatment in an American Indian population: A 10-year retrospective study. *J Endod* 2006;32:828–832.