

Original Research

Analysis of incidence of apical periodontitis in endodontically treated teeth: A clinical study

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ABSTRACT:

Background: Apical periodontitis is a sequel to endodontic infection and manifests itself as the host defense response to microbial challenge emanating from the root canal system. The prevalence of AP among adults in different populations is well documented in the literature. Hence; the present study was planned for assessing the incidence of apical periodontitis in root canal treated teeth. **Materials & methods:** Assessment of a total of 70 patients who underwent root canal therapy was done. Complete demographic details of all the patients were obtained. Clinical and radiographic examination of all the patients was carried out. Apical periodontitis was judged present in teeth in which the apical part of the periodontal space was less than twice the remaining lateral ligamental space and in which a radiolucency of more than twice the width of the lateral periodontal ligament space was associated with the apical portion of the root. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. **Results:** Apical periodontitis was found to be present in 17 patients' .i.e. the overall prevalence of apical periodontitis was found to be 32.08 percent. While assessing the incidence of apical periodontitis with age and gender distribution, non-significant results were obtained. **Conclusion:** Apical periodontitis is significantly prevalent among patients who have undergone root canal therapy.

Key words: Apical periodontitis, Root canal treated

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INTRODUCTION

Apical periodontitis is a sequel to endodontic infection and manifests itself as the host defense response to microbial challenge emanating from the root canal system. It is viewed as a dynamic encounter between microbial factors and host defenses at the interface between infected radicular pulp and periodontal ligament that results in local inflammation, resorption of hard tissues, destruction of other periapical tissues, and eventual formation of various histopathological categories of apical periodontitis, commonly referred to as periapical lesions. The treatment of apical periodontitis, as a disease of root canal infection, consists of eradicating microbes or substantially reducing the microbial load from the root canal and preventing re-

infection by orthograde root filling. The treatment has a remarkably high degree of success.¹⁻³

The prevalence of AP among adults in different populations is well documented in the literature. The prevalence of AP positively correlated with age and this tendency will presumably increase because of an increase in dentate population. Multi-rooted teeth have a higher prevalence of AP than single-rooted teeth, especially molars. Factors that determine the outcome of endodontic treatment are length and quality of endodontic filling and post-endodontic restoration of the tooth.⁴⁻⁶ Hence; the present study was planned for assessing the incidence of apical periodontitis in root canal treated teeth.

MATERIALS & METHODS

With the aim of assessing the incidence of apical periodontitis in root canal treated teeth, the present study was planned. Assessment of a total of 70 patients who underwent root canal therapy was done. Exclusion criteria for the present study included:

- Diabetic and hypertensive patients,
- Patients with any other systemic pathology,
- Patients with presence of any metabolic disorder

Only those patients were included who underwent root canal therapy for maxillary first molars. Complete demographic details of all the patients were obtained. Clinical and radiographic examination of all the patients was carried out. Apical periodontitis was judged present in teeth in which the apical part of the periodontal space was less than twice the remaining lateral ligamental space and in which a radiolucency of more than twice the width of the lateral periodontal ligament space was associated with the apical portion of the root. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

In the present study, a total of 70 patients were enrolled. Mean age of the patients was found to be 29.8 years. Among these 70 patients, apical periodontitis was found to be present in 17 patients’ .i.e. the overall prevalence of apical periodontitis was found to be 32.08 percent. In the present study, out of 17 patients with apical periodontitis, 5 patients each belonged to the age group of less than 35 years and more than 45 years, while the remaining 7 patients belonged to the age group of 35 to 45 years. 64.71 percent of the patients with apical periodontitis were males while the remaining were females. In the present study, while assessing the incidence of apical periodontitis with age and gender distribution, non-significant results were obtained.

Graph 1: Prevalence of apical periodontitis

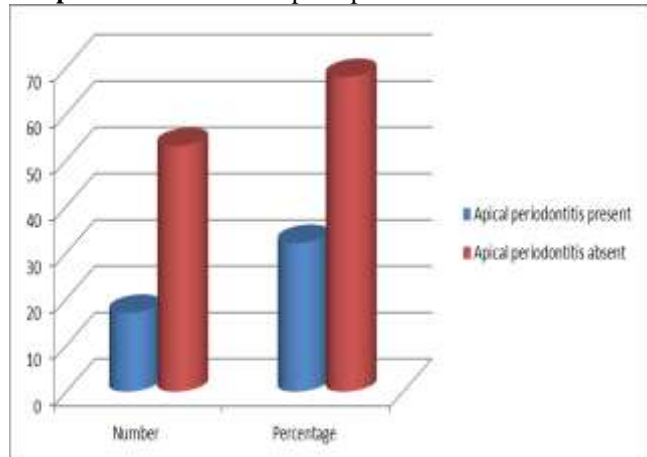


Table 2: Correlation of prevalence of apical periodontitis with age and gender distribution

Parameter		Number of patients	Percentage	p-value
Age group	Less than 35	5	29.41	0.82
	35 to 45	7	41.18	
	More than 45	5	29.41	
Gender	Males	11	64.71	0.35
	Females	6	35.29	

DISCUSSION

Apical periodontitis is a chronic inflammatory disorder of periradicular tissues caused by aetiological agents of endodontic origin. Persistent apical periodontitis occurs when root canal treatment of apical periodontitis has not adequately eliminated intraradicular infection. Problems that lead to persistent apical periodontitis include: inadequate aseptic control, poor access cavity design, missed canals, inadequate instrumentation, debridement and leaking temporary or permanent restorations. Even when the most stringent procedures are followed, apical periodontitis may still persist as asymptomatic radiolucencies, because of the complexity of the root canal system formed by the main and accessory canals, their ramifications and anastomoses where residual infection can persist.^{7- 9} Hence; the present study was planned for assessing the incidence of apical periodontitis in root canal treated teeth.

In the present study, a total of 70 patients were enrolled. Mean age of the patients was found to be 29.8 years. Among these 70 patients, apical periodontitis was found to be present in 17 patients’ .i.e. the overall prevalence of apical periodontitis was found to be 32.08 percent. Karabucak B et al evaluated the incidence of missed canals in endodontically treated teeth. A total of 1397 cone-beam computed tomography (CBCT) volumes taken from January 2013 to July 2015 were investigated. Limited view CBCT images were taken with Kodak 9000 3D System field of view at voxel size, 76 µm or Morita Veraviewpocs 3D F40 field of view at voxel size, 125 µm. All root canal-treated premolars and molars were included in the study. Unfilled canals appearing from cemento enamel junction to apex including splitting from a main canal at coronal, mid, or apical third were defined as missed-untreated canal. A periapical lesion was diagnosed when disruption of the lamina dura was detected and the low density area associated with the radiographic apex was at least twice the width of the periodontal ligament space. The overall incidence of missed canals was 23.04%. The incidence of

missed canals per tooth was highest in tooth #14 at 46.5% and tooth #3 at 41.3%. The incidence of missed canals was highest in the upper molars at 40.1% and lowest in the upper premolars at 9.5%. There was a significant difference in lesion prevalence when a canal was missed-untreated ($P < .05$). Teeth with a missed canal were 4.38 times more likely to be associated with a lesion. Limited field-of-view CBCT should be examined before any endodontic retreatment to identify missed canals.¹⁰

In the present study, out of 17 patients with apical periodontitis, 5 patients each belonged to the age group of less than 35 years and more than 45 years, while the remaining 7 patients belonged to the age group of 35 to 45 years. 64.71 percent of the patients with apical periodontitis were males while the remaining were females. Virtanen E et al assessed the association between AP and the prevalence of systemic diseases in a study population. The subjects were 150 patients from a randomly selected epidemiological sample of 1676 individuals. 120 accepted to participate and their basic and clinical examination data were available for these secondary analyses where dental radiographs were used to record signs for endodontic treatments and AP. Periapical Index and modified Total Dental Index scores were calculated from the x-rays to classify the severity of AP and dental infection burden, respectively. Demographic and hospital record data were collected from the Swedish National Statistics Center. Of the 120 patients 41% had AP and 61% had received endodontic treatments of which 52% were radiographically unsatisfactory. AP patients were older and half of them were smokers. AP and periodontitis often appeared in the same patient (32.5%). From all hospital diagnoses, cardiovascular diseases (CVD) were most common, showing 20.4% prevalence in AP patients. The results confirmed their hypothesis by showing that AP statistically associated with cardiovascular diseases.¹¹

In the present study, while assessing the incidence of apical periodontitis with age and gender distribution, non-significant results were obtained. Matijević J et al determined the prevalence of apical periodontitis and assess the quality of endodontic fillings in the population. A total of 1462 orthopantomograms from new patients at 6 different dental practices was analyzed. The presence of periapical lesions was determined by using the periapical index score (PAI). The quality of endodontic fillings was assessed according to the filling length and homogeneity. There were 75.9% of participants with endodontically treated teeth and 8.5% of all teeth were endodontically treated. Only 34.2% of endodontically treated roots had adequate root canal filling length, while 36.2% of root canal fillings had homogenous appearance. From the total number of teeth with intracanal post, 17.5% had no visible root canal filling. Using PAI 3 as a threshold value for apical periodontitis, periapical lesions were detected in 8.5% of teeth. Adequate quality of root canal fillings was associated with a lower prevalence of periapical lesions.

They found a large proportion of endodontically treated teeth with apical periodontitis and a correlation between the quality of endodontic filling and the prevalence of periapical lesions.¹²

CONCLUSION

From the above results, the authors conclude that apical periodontitis is significantly prevalent among patients who have undergone root canal therapy. However; further studies are recommended.

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