Research Article

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Assessment of Prevalence of Apical Periodontitis In Root Canal–Treated Teeth: A Clinical Study

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ABSTRACT

Background: Apical periodontitis (AP) is an inflammatory disorder of periradicular tissues occurring due to continuous microbial infection in the root canal of the affected tooth. Data from past literature have showed significant prevalence of AP in endodontic treated teeth. Hence; we planned the present study to assess the prevalence of AP in root canal treated teeth.

Materials & methods: A total of 100 patients were included in the present study, which underwent root canal therapy during the study period. According to the radiographic quality of root canal fillings and restorations, the teeth were classified as Adequate and Inadequate. Based on the radiographic findings, the prognosis of the root canal therapy was assessed in terms of Periapical index score (PAI). PAI score of 1 indicating healthy tooth while PAI 5 indicating tooth with severe periodontitis. All the results were compiled in Microsoft excel sheet and were analysed by SPSS software.

Results: Inadequate root canal therapy was performed in 80 cases. Among these 80 cases, healthy peri-apical tissue, as assessed by PAI score was found in 25 cases, while in the remaining 55 cases, peri-apical tissue was found to be unhealthy. Among the 20 cases of adequate treatment, healthy peri-apical tissue, as assessed by PAI score was found in 15 cases, while in the remaining 5 cases, peri-apical tissue was found to be unhealthy. The overall prevalence of AP was found to be 60 percent.

Conclusion: In general dentistry, special emphasis should be made on improving the quality of root canal therapy for promoting the quality of periodontal health and decreasing the incidence of associated peri-apical pathologies.

Keywords: Apical periodontitis, endodontics, dentistry.

INTRODUCTION

Within a span of couple of years after the first indications that inflammatory diseases and infections might be associated with the occurrence of cardiovascular events such as myocardial infarction, there is increasing evidence that they might even be the cause of such events.[1] As a chronic oral disease, marginal periodontitis was also considered to be a potential risk factor for acute myocardial infarction. Apical periodontitis (AP) is an inflammatory disorder of periradicular tissues caused by persistent microbial infection in the root canal of the affected tooth.[2-4]

Several cross-sectional studies have highlighted the prevalence of AP, and have reported a variety of ranges for this prevalence depending on the study

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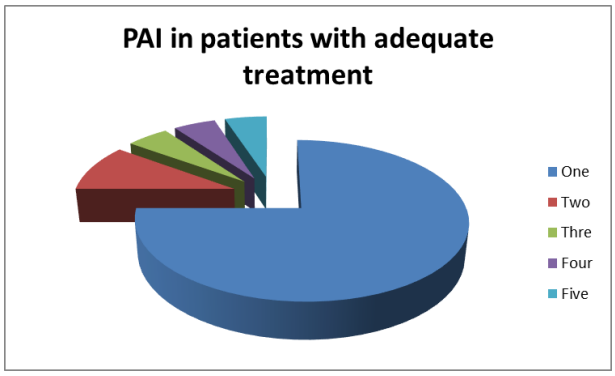
Table 1: Distribution of root canal treated teeth.

Tooth	Arch	
	Maxillary arch	Mandibular arch
Anterior	15	8
Premolars	20	13
Molars	25	19
Total	60	40

Table 2: Correlation of peri-radicular status of root canal treated teeth with quality of root canal therapy.

PAI	Adequate treatment (n=20)	Inadequate treatment (n=80)	Total (n=100)
1	15	25	40
2	2	20	22
3	1	18	19
4	1	15	16
5	1	2	3



Graph 1: Correlation of peri-radicular status of root canal treated teeth with adequate root canal therapy.

population and geographical area. The reported prevalence of AP in association with root-filled teeth has ranging upto sixty percent, and apical lesions have been found to develop around many endodontically treated teeth. Numerous studies in literature have focused on the prevalence of AP and quality of endodontic treatment through the evaluation of panoramic radiographs (OPG) or intraoral radiographs.[5-7] Hence; we planned the present study to assess the prevalence of AP in root canal treated teeth.

MATERIALS & METHODS

The present study was conducted in the department of endodontic and periodontology of the dental institute and it included assessment of prevalence of AP in root canal treated teeth. A total of 100 patients were included in the present study, which underwent root canal therapy during the study period. Ethical approval was obtained from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. Pre-operative and postoperative peri-apical radiographs of all the patients were obtained. According to the radiographic quality of root canal fillings and restorations, the teeth were classified as follows:

- Adequate: Complete obturation of all canals, absence of voids, root canal fillings end from 0–2 mm short of the radiographic apex.
- Inadequate: Incompletely obturated canals, presence of voids, root canal fillings end more than 2 mm short of the radiographic apex or grossly overfilled.[7,8]

Based on the radiographic findings, the prognosis of the root canal therapy was assessed in terms of Periapical index score (PAI) based on the criteria described previously in the literature.[8] PAI score of 1 indicating healthy tooth while PAI 5 indicating tooth with severe periodontitis. All the results were compiled in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

In the present study, a total of 100 root canal cases were analysed. Among these 100 patients, 60 were done in the maxillary arch while the remaining 40 were done in the mandibular arch. Among the maxillary arch, 15 were done in anterior teeth, 20 were done in premolars while 25 were done in molars. Among the mandibular arch, 8 were done in anterior teeth, 13 were done in premolars while 19 were done in molars. Inadequate root canal therapy was performed in 80 cases. Among these 80 cases, healthy peri-apical tissue, as assessed by PAI score was found in 25 cases, while in the remaining 55 cases, peri-apical tissue was found to be unhealthy. Among the 20 cases of adequate treatment, healthy peri-apical tissue, as assessed by PAI score was found in 15 cases, while in the remaining 5 cases, peri-apical tissue was found to be unhealthy. The

overall prevalence of AP was found to be 60 percent.

DISCUSSION

In the present study, 60 cases were done in the maxillary arch while the remaining 40 cases were done in the mandibular arch. Among the maxillary arch, 15 were done in anterior teeth, 20 were done in premolars while 25 were done in molars. Peciuliene V et al investigated the technical quality of root fillings in root filled teeth, their association with periapical status and prevalence of apical periodontitis. Clinical and radiographic examination on 83 patients was performed using the scoring system (Periapical index (PAI)). From the periapical radiographs status of endodontically treated teeth was recorded. For each tooth the following items were surveyed: the presence of a root filling, its quality (lateral seal and length in the root canal) and the periapical status. Of the 2186 functional teeth, 283 had undergone root canal treatment (13%). Apical periodontitis was present in 43,1% of root filled teeth. Only 28.6% of the root filled teeth fulfilled the criteria of an acceptable root canal filling. The results of their study indicated that inadequate root fillings were more often associated with an increased prevalence of apical periodontitis.[9]

In the present study, among the mandibular arch, 8 were done in anterior teeth, 13 were done in premolars while 19 were done in molars. Inadequate root canal therapy was performed in 80 cases. Covello F et al analyzed the prevalence of AP in relation to the quality of endodontic treatment in an Italian adult population. They examined panoramic radiographs (OPG) of 384 patients aged between 18 and 60 years who came under observation for a first dental examination. 9423 teeth were analysed. By examining the radiographs 1076 teeth had undergone previous endodontic treatment, of these 448 (41.6%) had AP. Statistical analysis shows a significant association between periapical status and quality of endodontic treatment ($p < 0.001$), between periapical status and quality of root canal filling and between periapical status and quality of coronal restoration. The prevalence of AP was found to be closely related to the quality of endodontic treatment, quality of root canal filling and coronal restoration.[10]

Among the 80 inadequate cases, healthy peri-apical tissue, as assessed by PAI score was found in 25 cases, while in the remaining 55 cases, peri-apical tissue was found to be unhealthy. Among the 20 cases of adequate treatment, healthy peri-apical tissue, as assessed by PAI score was found in 15 cases, while in the remaining 5 cases, peri-apical tissue was found to be unhealthy. The overall prevalence of AP was found to be 60 percent. Mukhaimer R et al determine the prevalence of apical periodontitis and the technical quality of root canal fillings in a Palestinian sub-population. The panoramic radiographs of 258 patients (142 females, 116 males) attending dental clinics were examined to identify the presence of apical lesions associated with any remaining teeth, excluding third molars. The technical quality of root canal fillings was also evaluated by assessing apical extension from the radiographic apex. Of 6482 teeth examined radiographically, 978 (15.1%) had radiographic signs of apical periodontitis (AP). The prevalence of AP was 8.3% in teeth without filled roots and 59.5% (509/855) in root canal-treated teeth. The prevalence of AP and endodontic treatment increased with age and differed significantly ($p < 0.05$) between males and females. The majority (74.5%) of root canal fillings was performed inadequately, and most (77.2%) inadequate fillings were >2 mm short of the radiographic apex. The presence of AP was correlated significantly with poorly executed root canal fillings. Their study found a high prevalence and incidence of AP in association with root-filled teeth.[11]

CONCLUSION

Under the light of above-mentioned data, the authors conclude that in general dentistry, special emphasis should be made on improving the quality of root canal therapy for promoting the quality of periodontal health and decreasing the incidence of associated peri-apical pathologies. However; further studies are recommended.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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