

Original Research

Assessment of periapical radiolucency in teeth treated with periapical surgery

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ABSTRACT:

Background: Bacterial infection of the dental pulp may lead to periapical lesions. They are generally diagnosed either during routine dental radiographic examination or following acute pain in a tooth. Various studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions. **Aim of the study:** To study assessment of periapical radiolucency in teeth treated with periapical surgery. **Materials and methods:** The present study was conducted in the Department of Conservative Dentistry and Endodontics of the institution. For the study, we reviewed the records of patients who underwent peri-apical surgery between 2018-2019 at the Department of Endodontics. An informed written consent was obtained from the individuals whose records were reviewed. The records of the patients included initial clinical examination, chief complaint and initial symptoms, pre-operative and post-operative radiographs, summary of treatment provided and history of patients. The records and radiographs were analysed visually by 2 oral surgeons and 2 endodontists. A periapical lesion was considered as radiolucency of more than 1 mm. For the lesions with diameter > 5 mm, they were labelled as large lesions. **Results:** We observed that the number of maxillary anterior teeth was 12, maxillary premolar teeth was 5, and number of molars was 2. Similarly, the number of mandibular anterior teeth was 8 and mandibular premolars were 3 in number. We observed that no radiolucency was seen in 16 patients, radiolucency <5 mm was seen in 8 patients, radiolucency >5 mm was seen in 4 patients and radiolucency >10 mm was seen in 2 patients. **Conclusion:** Within the limitations of the present study, it can be concluded that periapical surgery is fairly successful approach for the management of periapical lesions which cannot be approached through conventional methods. Further studies are required in this context.

Keywords: Periapical surgery, root canal treatment, periapical radiolucency.

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Introduction:

Bacterial infection of the dental pulp may lead to periapical lesions.¹ They are generally diagnosed either during routine dental radiographic examination or following acute pain in a tooth. Most periapical lesions (>90%) can be classified as dental granulomas, radicular cysts or abscesses.² The incidence of cysts within periapical lesions varies between 6 and 55%. The occurrence of periapical granulomas ranges between 9.3 and 87.1%, and of abscesses between 28.7 and 70.07%.³ The ultimate goal of endodontic therapy should be to return the involved teeth to a state of health and function without surgical intervention.⁴

All inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures.⁵ Surgical intervention is recommended only after nonsurgical techniques have failed. Besides, surgery has many drawbacks, which limit its use in the management of periapical lesions. Various studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions. A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical endodontic therapy has also been reported.⁶ Hence, the present study was conducted to study assessment of periapical radiolucency in teeth treated with periapical surgery.

Materials and methods:

The present study was conducted in the Department of Conservative Dentistry and Endodontics of the institution. Prior to starting the study, we had approval from the ethical board of the institute for the study. For the study, we reviewed the records of patients who underwent peri-apical surgery between 2018-2019 at the Department of Endodontics. An informed written consent was obtained from the individuals whose records were reviewed. The records of the patients included initial clinical examination, chief complaint and initial symptoms, pre-operative and post-operative radiographs, summary of treatment provided and history of patients. The patients whose records had faulty or low-quality radiographs were excluded from the study. Also, the patients whose records did not have complete information regarding the treated tooth were excluded from the study. A total of 30 patients were selected for the study.

The records and radiographs were analysed visually by 2 oral surgeons and 2 endodontists. A periapical lesion was considered as radiolucency of more than 1 mm. For the lesions with diameter > 5 mm, they were labelled as large lesions. Whereas, for the lesions with diameter <5

mm was labelled as small lesions. They also assessed the clinical status of the said tooth for each patient. For the clinical status evaluation, complete tooth along with periapical tissues were analysed.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student’s t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

Results:

Table 1 shows the distribution of treated teeth. We observed that the number of maxillary anterior teeth was 12, maxillary premolar teeth was 5, and number of molars was 2. Similarly, the number of mandibular anterior teeth was 8 and mandibular premolars were 3 in number. [Fig 1] Table 2 shows the distribution of teeth according to periapical radiolucency status. We observed that no radiolucency was seen in 16 patients, radiolucency <5 mm was seen in 8 patients, radiolucency >5 mm was seen in 4 patients and radiolucency >10 mm was seen in 2 patients. The results were compared and were seen to be statistically non-significant. [Fig 2]

Table 1: Distribution of treated teeth

	Maxillary			Mandibular	
	Anterior	Premolar	Molar	Anterior	Premolar
Number of teeth	12	5	2	8	3

Fig 1:

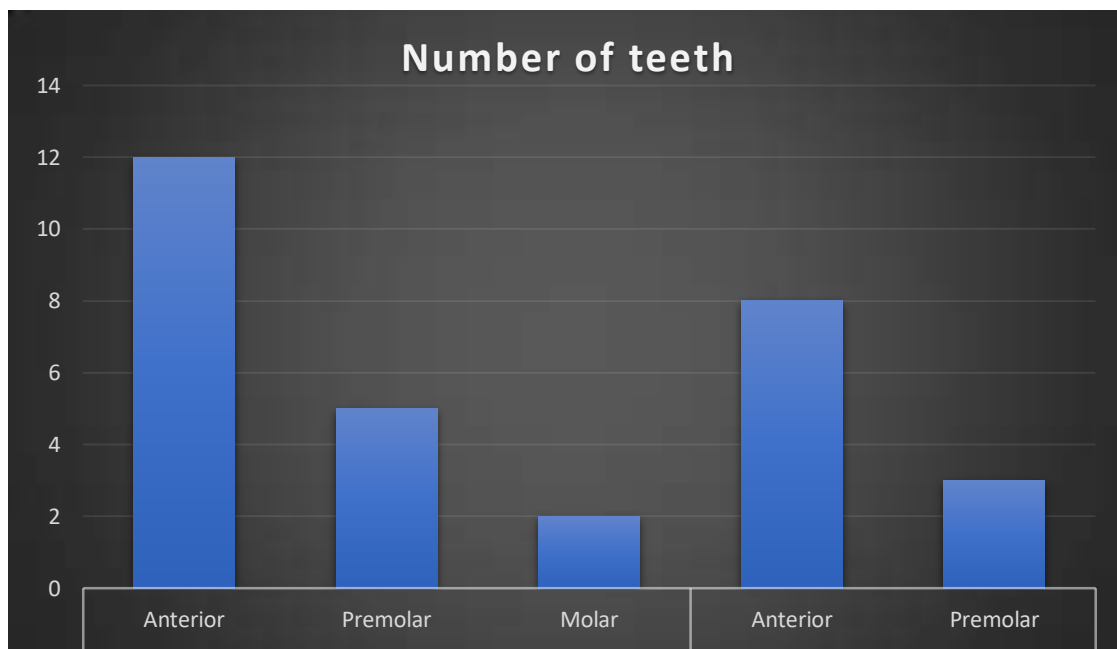
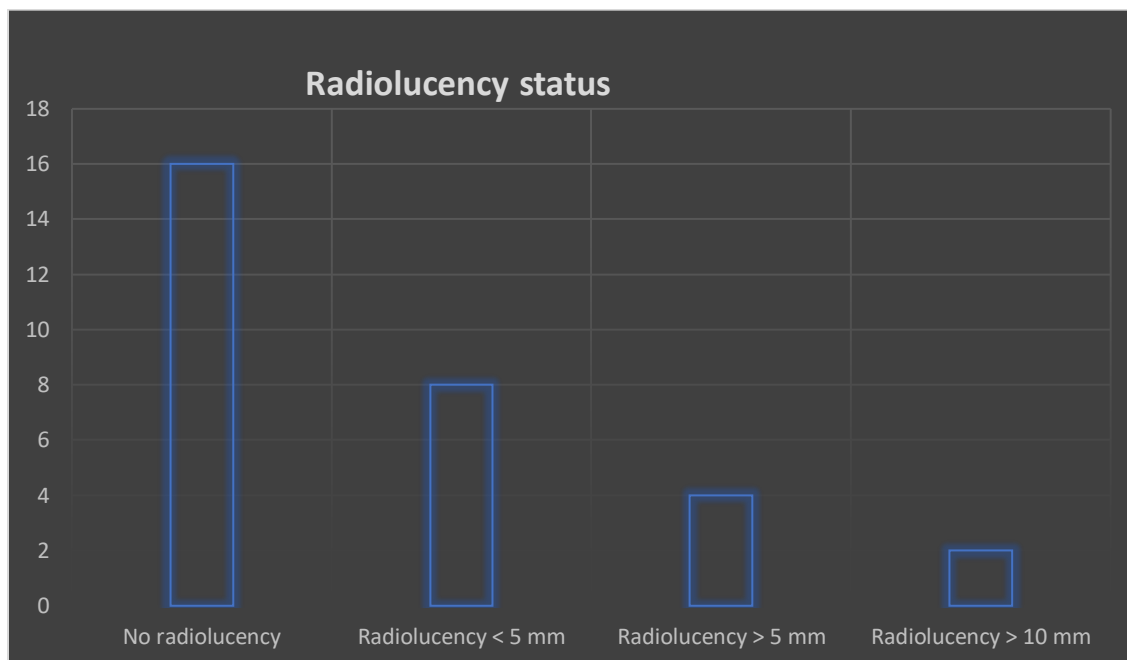


Table 2: Distribution of teeth according to periapical radiolucency status

Radiolucency status	No of patients	p-value
No radiolucency	16	0.221
Radiolucency < 5 mm	8	
Radiolucency > 5 mm	4	
Radiolucency > 10 mm	2	

Fig 2:



Discussion:

In the present study, we observed that the apical surgery was done mostly in case of maxillary anteriors and mandibular anteriors. Also, we observed that 16 patients had no radiolucency post surgically. Only 2 patients had radiolucency >10 mm. The results were compared and were found to be statistically non-significant. The results were compared to previous studies from literature. Paul ML et al evaluated the periapical pathology of posterior teeth clinically and radiographically by using MTA in orthograde way and avoiding traumatic surgical exploration. In the first case, the patient reported with intraoral sinus and pus discharge related to tooth #45. On radiograph, open apex (blunderbuss) was found along with periapical radiolucency. In the second case, the patient reported with pain and swelling related to tooth #26, having large periapical radiolucency related to the palatal canal. On vitality test, both the teeth responded negative, i.e., non-vital. Conventional RCT was planned in both the cases with orthograde MTA- Angelus (Angelus, Londrina, PR, Brazil) apical plug followed by the proper obturation with gutta-percha (G.P.), and after

that the patients were kept on periodic follow-up and the outcome-based clinical and radiographic criteria were assessed. The post-obturation assessment at 1-month interval showed changes in the size of radiolucency with a gradual decrease, and after 6 months a remarkable decrease of radiolucency or the defect was almost filled with bone formation visible around the roots. Grønkjær LL et al determined the prevalence and predictors of periapical radiolucency in patients with cirrhosis and the association with systemic inflammation status and cirrhosis-related complications. A total of 110 cirrhosis patients were consecutively enrolled. Periapical radiolucency was defined as the presence of radiolucency or widening of the periapical periodontal ligament space to more than twice the normal width. Predictors of periapical radiolucency and the association with systemic inflammation markers and cirrhosis-related complications were explored by univariable and multivariable logistic regression analyses. Periapical radiolucency was present in one or more teeth in 46% of the patients. Strong predictors were gross caries and severe periodontitis. Also old age and smoking were predictors. However, cirrhosis

etiology or severity were not predictors. The patients with periapical radiolucency had higher C-reactive protein and lower albumin contents than those without. Furthermore, the patients with periapical radiolucency had a higher prevalence of cirrhosis-related complications such as ascites, hepatic encephalopathy, and/or variceal bleeding. They concluded that periapical radiolucency is often present as an element of poor oral health status and likely has an adverse clinical significance, which should motivate diagnostic and clinical attention to the findings.^{7,8}

Persić R, Kqiku L et al compared the periapical status of endodontically treated teeth between Austrian and Croatian adult patients and determine its relation to age, sex, position of teeth, and length of root canal filling. The study was conducted from 2007 to 2009 at two university dental clinics and included 163 Croatian (412 teeth) and 101 Austrian (430 teeth) patients. We assessed the periapical status of endodontically treated teeth by using the periapical index system and determined its relation to age, sex, position of teeth, and length of root canal filling. Austrian patients had a greater number of diseased endodontically treated teeth than Croatian patients. In the age group 31-40 years, Austrian patients had apical periodontitis significantly more often than Croatian patients. In relation to sex and position of teeth, no significant difference was found between the two groups. In Croatian patients, apical periodontitis was significantly more often present in molar than premolar and front teeth. In Austrian patients, apical periodontitis was significantly more often present in molar and premolar than front teeth. Croatian and Austrian patients significantly differed in the number of adequately filled and underfilled teeth with AP. they concluded that apical periodontitis was significantly more present in endodontically treated teeth in Austrian patients. The difference in the periapical status between Croatian and Austrian patients was most related to age and length of root canal filling. Shekhar V et al presented two cases where cone beam computed tomography (CBCT) was used for the diagnosis, treatment planning, and followup of large periapical lesions in relation to maxillary anterior teeth treated by endodontic surgery. Periapical disease may be detected sooner using CBCT, and their true size, extent, nature, and position can be assessed. It allows clinician to select the most relevant views of the area of interest resulting in improved detection of periapical lesions. CBCT scan may provide a better, more accurate, and faster method to differentially diagnose a solid (granuloma) from a fluid-filled lesion or cavity (cyst). In the present case report, endodontic treatment was performed for both the cases followed by endodontic surgery. Biopsy was done to establish the confirmatory histopathological diagnosis of the

periapical lesions. Long-term assessment of the periapical healing following surgery was done in all the three dimensions using CBCT and was found to be more accurate than IOPA radiography. It was concluded that CBCT was a useful modality in making the diagnosis and treatment plan and assessing the outcome of endodontic surgery for large periapical lesions.^{9,10}

Conclusion:

Within the limitations of the present study, it can be concluded that periapical surgery is fairly successful approach for the management of periapical lesions which cannot be approached through conventional methods. Further studies are required in this context.

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