ORIGINAL ARTICLE

RADIOGRAPHIC ASSESSMENT OF APICAL RESORPTION IN INFLAMMATORY PERIAPICAL PATHOLOGIES

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ABSTRACT

The aim of this study was to evaluate the distribution and severity of periapical root resorption in different periapical pathologies radio graphically in patients visiting College of Dentistry, Jouf University. This retrospective study was conducted by examining the digital intraoral periapical radiographs of the patients who attended College of Dentistry, Jouf University in 1 year period. The ethical clearance was obtained from institutional ethical committee. Data were collected from the files of the patients using a structured proforma regarding the type of periapical lesions, presence or absence of apical root resorption (ARR). Collected data were analyzed using SPSS version 21 by applying Chi-square test to check the association between ARR and periapical pathologies.

In the present study the radiographs examined belonged predominately to the male patients. Most of the radiographs examined were of patients who were in the age group of 18-35 years, followed by 36-55 years and >55 years. Out of 396 radiographs with periapical pathologies, 148 (37.37%) showed ARR. Among 148 ARR, 115 (77.70%) had moderate resorption and 33 (22.29%) had severe. ARR was higher in periapical abscess (51.78%) followed by periapical cyst and granuloma (37.63%) and apical periodontitis (20.40%). Among 248 male patients with periapical pathologies, 90 (60.81%) showed ARR in which 72 were moderate and 18 were severe. Among 148 female cases, 58 (39.18%) showed ARR in which 115 cases showed moderate and 33 cases revealed severe. ARR was slightly higher in 18-35 years age group (45.94%) followed by the age group of 36-55 years (43.24%) and above. It can be concluded from this study that there is increased occurrence of ARR in periapical abcess than periapical granuloma and cyst.

Keywords: *Apical root resorption, periapical pathology, abscess, cyst*

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INTRODUCTION

Apical root resorption (ARR) is a frequent complication of periapical pathologic process emerging as a result of inflammatory process in pulp and periapical tissues. The tenacious experience among microorganisms and host resistances at the periapical site results in local inflammatory process releasing various chemical mediators, consequently beginning the pathological process in periapical tissues.[1] These chemical mediators of inflammation may prompt root resorption similarly as they lead to bone resorption.[1,2] The resorbed region at the apical portion of the root may give the appropriate environment to various microorganisms, which can delay the healing process of periapical pathologies and thereby resulting in failure of endodontic treatment in some cases.[3] Moreover, resorbed root surfaces are usually not inside the range of root canal instrumentation, are troublesome in getting a perfect apical seal.[4] Intraoral periapical (IOPA) radiographs provides accurate knowledge required for diagnosis

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and treatment planning of various lesions.[5] In modern day dental practice, cone beam computed tomography (CBCT) turned out to be progressively precise; be that as it may, because of its high radiation dose its utilization winds up unfeasible for routine endodontic treatment. The resorptive sites located on the apical portion of the root surface have extraordinary achieving the success endodontic therapy. The mistakes in proper diagnosis or planning the treatment of resorptive roots may prompt failure of endodontic therapy.[6] Henceforth, in this research an endeavor was made to evaluate the distribution and severity of ARR in various periapical pathologies.

MATERIALS AND METHODS

Sample selection

The present retrospective radiographic study was conducted by examining the IOPA radiographs of the patients visiting College of Dentistry, Jouf University, during September 2017 to September 2018. Patient age, gender and other details were recorded from their respective files. Patient with clinically diagnosed periapical pathology having periapical radiograph in the record were included in the study. Patients suffering from endocrine disorder, advanced perapical cyst or tumour, those undergoing orthodontic treatment and teeth with root canal treatment were excluded from the study. Patients presenting with intra oral and extra oral swellings, presence of fistula, discolored teeth were considered for periapical radiolucencies. Each IOPA radiograph was evaluated for, the size of the lesion, periodontal ligament space and lamina dura.

Collection of Data

The diagnosis of different periapical lesions and the ARR were made based on the radiographic findings following the criteria as mentioned in the previous similar study.[7]

All the IOPA radiographs examined in this study were obtained through Soredex Digital intraoral radiographic Unit with long cone technique by maintaining all the exposure parameters constant.

Statistical analysis

The obtained data were analyzed using SPSS version 21.0 by applying Chi-square test to find out association between ARR and type of periapical pathologies and the P value was set at <0.05 as significant.

RESULTS

The gender distribution is mentioned in graph 1, in our study most of the radiographs examined were of patients who were in the age group of 18-35 years, followed by 36-55 years and >55 years (Graph 2).

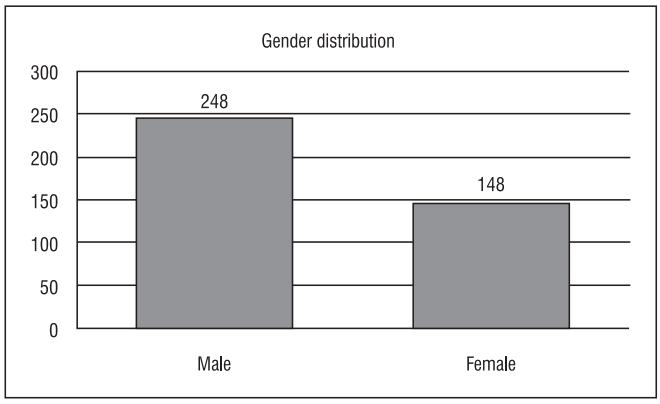

Fig 1: Gender distribution

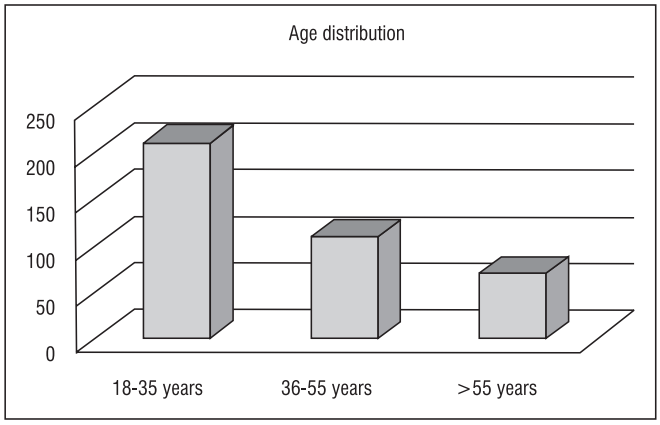

Fig 2: Age distribution

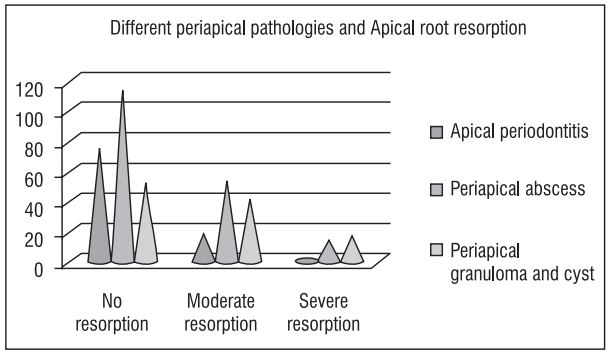

Fig 3: Different periapical pathologies and Apical root resorption

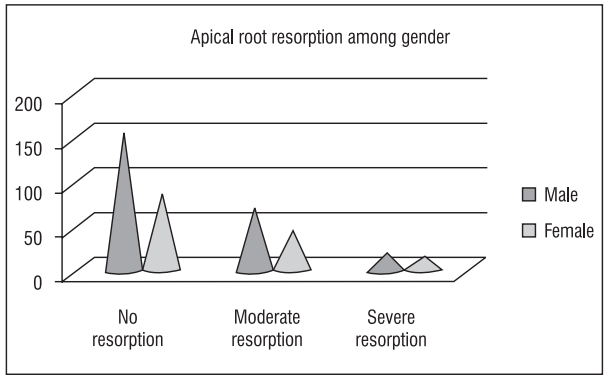

Fig 4: Apical root resorption among gender

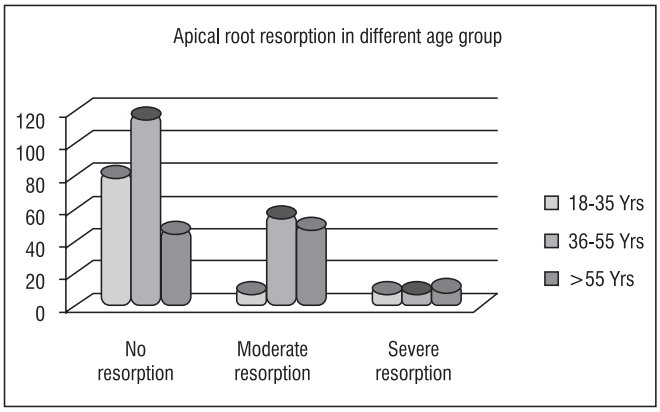

Fig 5: Apical root resportion in different age groups

Out of 396 radiographs with periapical pathologies, 148 (37.37%) showed ARR. Among 148 ARR, 115 (77.70%) had moderate resorption and 33 (22.29%) had severe resorption. ARR was higher in periapical abscess (51.78%) followed by periapical cyst and granuloma (37.63%) and apical periodontitis (20.40%) which was statistically significant (P = 0.000 < 0.05) (Graph 3).

Among the 248 male patients with periapical pathologies, 90 (60.81%) showed ARR in which 72 were moderate and 18 were severe ARR. Among 148 female cases, 58 (39.18%) showed ARR in which 115 cases showed moderate and 33 cases revealed severe ARR (Graph 4).

Distribution of ARR among different age groups is represented in Graph 5.

DISCUSSION

The most common causative factors of ARR are pulpal and periapical pathologies, orthodontic tooth movements, traumatic injury, cysts, tumors, systemic disorders or chemical injuries.[8]

IOPAR is regarded as the reliable diagnostic tool for assessment, diagnosis and treatment planning of various intraoral localized bony pathologies. ARR manifests as a radiolucency on the outer dentinal surface with or without shortening of roots.[4]

Extensive radiographic studies regarding the prevalence of ARR in periapical pathologies are not available in literature. Limited studies were carried out to know the prevalence of ARR in relation to different periapical lesions on extracted teeth using methods other than IOPAR, by employing scanning electron microscopy, tomography and histopathology .[9,10]

In a previous study, CBCT was proved to be efficient in providing accurate results in diagnosing the resorptive lesions when compared with digital intraoral radiographs. In the same study the authors observed that the intraoral digital radiography may provide acceptable level of precision in diagnosing the resorption lesions. CBCT has also the advantages of providing 3D images without superimposition and image manipulation etc.[11]

Other similar studies in literature observed that CBCT can be reliable and valid imaging technique in detection of resorption than intraoral radiographs. Despite the fact that CBCT has better diagnosing ability, its increased radiation dose restrains its utilization for routine periapical lesions.[12]

The overall prevalence of ARR in the present study was 37.37% which was moderately less than the observation by Wei et al. who noticed a prevalence of 40.5%.[7] Estrela et al. noticed a comparatively higher prevalence of ARR (61.44%) observed under SEM, on extracted teeth with periapical pathologies.[13] Compared to this, a lesser prevalence rate of 23.9% was reported when examined using CBCT.[14]

Histopathological evaluation by various authors reported an increased prevalence of ARR compared to that of radiological studies; and the comparison of the radiographic and histological findings of ARR revealed the limited authenticity of radiographs in diagnosing the ARR.[4,10] The comparison of the radiographic and histological findings of ARR showed the poor reliability of radiographs in the diagnosis of ARR.[4,10]

Lower prevalence of 19% ARR was recorded by Laux et al.[4] and 28.8% by Tsesis et al.[15] when observed on the panoramic radiographs. As the panoramic images have poor resolution and sharpness when compared to digital intraoral radiographs, the lower prevalence in these studies may be justified.[16]

In this study, significantly higher percentage of ARR was noted in cases of periapical abscess and apical periodontitis when compared to periapical cyst and granuloma and this observation was not in accordance with the findings of Wei et al.,[7] whereas Vier and Figueiredo[10] observed no correlation among root resorption and the nature of the periapical pathology.

The severity of ARR may influence the result of endodontic treatment, extreme ARR may result in extrusion of obturating material into the periapical region. This may thus continue periapical irritation and prompt a foreign body reaction and potentially incite further root resorption.[9]

The most ideal method for assessing ARR is by histopathological technique in vitro, since intraoral radiographs can't distinguish the resorption in beginning stages, thus there is a propensity of under estimation of accurate prevalence of ARR.[17] Hence, while managing the long standing periapical pathologies, dental practitioner ought to know that ARR might exists despite

the fact that it may not be observed on the routine radiographs.[9]

CONCLUSION

The observations of this study revealed that there is increased prevalence of ARR in periapical abscess than periapical granuloma and cyst.

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