

Incidental Findings in OPG of Orthodontic Patients Attending a Private Dental Institute

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ABSTRACT

Radiographic incidental findings of abnormality refers to the occult or hidden abnormality that exhibits no clinical signs and symptoms but is present as an incidental finding when the radiograph is taken to detect some pathology related to the patient's chief complaint. OPG or panoramic radiography is a routinely taken extraoral radiograph which shows the teeth and the maxillofacial structures and along with incidental findings. The study was performed in a university setting, it reviewed patient records and analysed the panoramic radiographs of 400 patients. The collected data were compiled and tabulated using Microsoft Excel, then reviewed and exported to SPSS for performing statistical analysis. The prevalence of the incidental findings was found to be 34.5 %. A female predilection was observed (19.75 %) and patients belonging to the 30 - 39 years had a greater number of incidental findings (18 %). Impacted third molar (10.5 %) and enostoses (3 %) were the common incidental findings. Early diagnosis of incidental pathologies will provide important preoperative information which leads to better treatment planning for the patient.

KEYWORDS

Impacted third molars, Pulp stones, Periapical lesion, Orthodontic patients, Enostoses, Incidental findings, OPG, Novel study

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INTRODUCTION

Panoramic radiography, also called panoramic x-ray (OPG) Ortho Pantomo Gram is a two-dimensional dental x-ray examination that captures the entire mouth in a single image, including the teeth, upper and lower jaws, surrounding structures and tissues. They provide a general overview of both jaws and their dentition and the temporomandibular joints, cervical vertebrae, and the inferior portion of the orbital cavity.¹ It is also known as a routine radiological diagnostic tool for the examination since it uses relatively low doses of radiation approximately 20 Sv as compared to a full mouth radiograph which utilizes series approximately 171.² The indications of OPG are cysts and tumours of the Jaws, advanced periodontal diseases, oral cancer, evaluation of impacted teeth including wisdom teeth such as depth and angulation of impaction, in addition to the relationship to adjacent structures, jaw disorders such as temporomandibular joint or TMJ disorders, sinusitis etc. Due to low resolution images that are unsuitable for examining details or detecting carious lesions and shadows of spine in midline interrupts examination of lower anterior.³ sometimes, apart from required information, incidental findings are present on the radiographs. Identification and reporting of such findings is of paramount importance because they may necessitate medical and/or dental intervention.

Radiographic incidental findings of abnormality refers to the occult or hidden abnormality that exhibits no clinical signs and symptoms but is present as an incidental finding when the radiograph is taken to detect some pathology related to the patient's chief complaint. Commonly, the radiographs are prescribed when the dentist thinks that they are likely to offer useful diagnostic information that will influence the treatment plan. Often some clinical sign or symptom or finding from the patient's history indicates the need for a radiologic examination. The information obtained from the clinical examination is used first to select the appropriate radiograph and later to aid in their interpretation.¹ Radiographic incidental findings in the jaws include a combination of dental and/or intraosseous findings. The consequences of some of these incidental findings may be quite serious.⁴ Therefore, one should avoid limiting attention to one particular region of the film; rather, all aspects of each image should be examined systematically. If the presence of any abnormalities is detected in advance, the prognosis is improved; moreover, it may reduce the mortality and morbidity rate to some extent. There are only limited studies that

have analyzed the prevalence of abnormal findings in radiographs ordered primarily for chief complaint related findings. Most of these Studies described as an isolated case reports on dentigerous cysts, Keratocystic odontogenic tumor (KOT), Gorlin Goltz syndrome, and maxillary sinus or Temporomandibular Joint pathologies.

Our team has extensive knowledge and research experience that has translate into high quality publications.⁵⁻²⁴

MATERIALS AND METHODS

Study Design

This is a retrospective study conducted in a private dental institution. The panoramic radiographs were reviewed for different types of patient positioning errors by a trained examiner. The advantage of conducting the study in an institutional set up provides easy access to patient records. The OPGs of 400 patients were examined from the archives of dental radiology of the institution. A wide age range is selected for the study. The institutional ethical committee provided approval for the study.

Inclusion criteria

1. OPGs of patients undergoing orthodontic treatment
2. Patient with incidental findings

Exclusion criteria

1. Incomplete patient data
2. Duplicate patient data
3. OPG with errors
4. Patients with more than one incidental finding

Sampling

A total of 400 OPGs of patients were examined to find out the prevalence of patient positioning errors. Convenient sampling method was used to select the OPGs for the study and they were chosen randomly. The data obtained from the radiographs were cross verified with the case records of the patients.

Data collection

All the data after thorough checking for duplicates, incomplete entries and cross verification with case records were entered in Microsoft excel spread sheet in order to organise the data. The variables obtained from the data included age, gender, presence and absence of incidental findings and the type of incidental findings. Here age, gender is the independent variables and the types of incidental finding are the dependent variable.

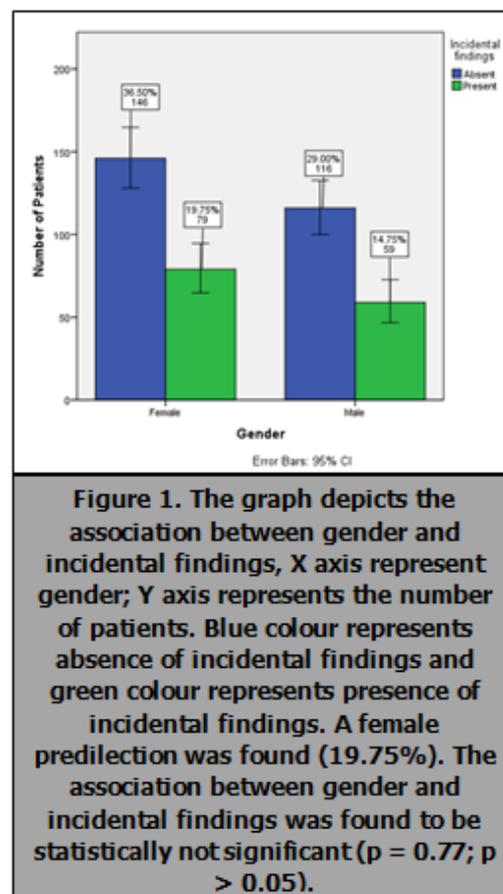
Statistics

The statistical analysis of the obtained data was performed by the SPSS software version 23.0. The data from the excel spread sheet was transferred to SPSS software for analysis. Chi square tests were employed in order to find the association between different variables. The p value less than 5 % was considered statistically significant. The final results are presented in the form of graphs and tables for further interpretation and discussion.

RESULTS AND DISCUSSION

Out of the 400 patients 138 patients had incidental findings. The prevalence of the incidental findings among the patients undergoing orthodontic treatment is 34.5 %. This number appears to be significant and is probably due to the sample characteristics and Bond mark L et al. found a prevalence of 8.7 % which is less compared to the current study. The difference in the values could be due to the ethnicity of the samples. These entire incidental findings were diagnosed only based on the panoramic radiographs and were not correlated with clinical findings hence a definitive diagnosis was not possible in the current study. The same problem was faced by Bond mark L, et al. in their study.²⁵

The distribution of the incidental findings was studied among the males and females (Figure 1). Majority of the males and females did not have the incidental findings. Among those who had the findings, a slight female predilection (19.75 %) was seen. The males having the incidental findings were 14.75 %. The association between the gender and the incidental findings were found to be statistically not significant ($p > 0.05$). A Study done reveals that there was a male predilection (53.68 %) in their study.²⁶ This finding is in contrast to the current study. The difference could be due to the larger sample size (6780) taken by the authors. The results of were consistent with the current findings where the author also found a female predilection (64.4 %) for incidental findings. This similarity could be due to a similar sample size in both the studies.²⁵



The incidental findings were studied among different age groups (Figure 2). The 30-39 year age group had the most incidental findings (18 %). This was followed by 20-29 years (9.75 %), 50 - 59 years (3.75 %) and finally the 40-49 years (3 %). The association between the age and the incidental findings were found to be statistically significant ($p < 0.05$). The study done by MacDonald et al revealed the most prevalent age group to have incidental findings is the 21 - 30 years. The finding is slightly different from the current study and could probably be due to a larger sample size and the ethnicity of the sample.

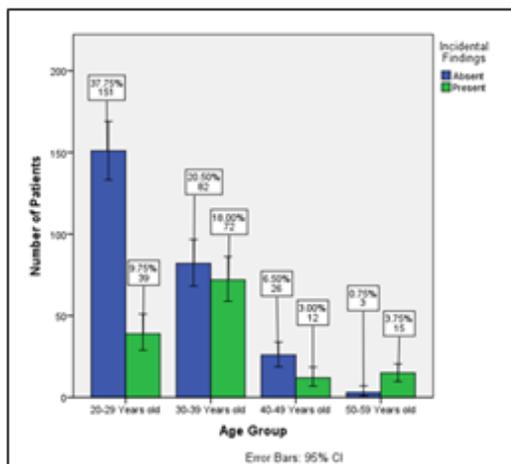


Figure 2. The graph depicts the association between age and incidental findings, X axis represents the age, Y axis represents the number of patients. Blue colour represents absence of incidental findings and green colour represents presence of incidental findings. Maximum number of incidental findings were found in the patients aged between 30-39 (18%). The association between age and incidental findings was found to be statistically significant ($p = 0.000$; $p < 0.05$)

The high occurrence of impacted teeth could be attributed to the evolutionary reduction in the jaw size which leads to tooth size and jaw length discrepancy. The occurrence of enostoses could be due to increased osteoplastic activity in the bone.²⁸

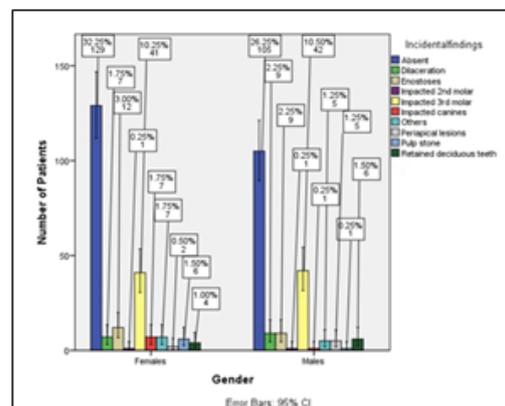
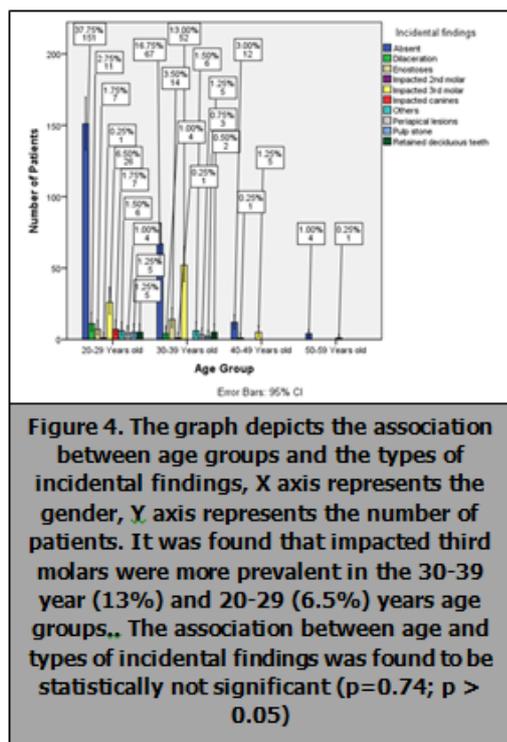


Figure 3. The graph depicts the association between gender and the types of incidental findings, X axis represents gender, and Y axis represents the number of patients. The impacted third molar was found to be the most common finding in males and females (10.25% and 10.5% respectively). The association between gender and type of incidental findings was found to be statistically not significant ($p = 0.11$; $p > 0.05$).

The various types of incidental findings were studied among the males and females [Figure 3]. Among the different types of incidental findings, the impacted third molar was found to be the most common finding in males and females (10.25 % and 10.5 % respectively). This was followed by enostoses otherwise known as dense bone island and idiopathic osteosclerosis which was slightly more in females (3 %) compared to males (2.25 %). The least common finding was impacted second molars which were equally distributed in males and females (0.25 %). Males also showed the least occurrence of impacted canines (0.25 %) but females had a slightly higher occurrence of impacted canines (1.75 %). Other findings such as dilacerations, periodical lesions, pulp stones, retained deciduous teeth and other findings such as a calcified stylohyoid ligament were found in smaller numbers. The association between the gender and the type of incidental findings were found to be statistically not significant ($p > 0.05$). Found idiopathic osteosclerosis (38.88 %) to be the most common incidental finding in their study.²⁶ found impacted teeth to be the most common dental related anomaly in their study.²⁷ These findings were in agreement with the current study findings.

The types of various incidental findings were studied among different age groups [Figure 4] and it was found that impacted third molars were more prevalent in the 30-39 year (13 %) and 20-29 (6.5 %) year's age groups. This was followed by idiopathic osteosclerosis in the 30-39 years (3.5 %) and 20-29 years (1.75 %) age groups. The least was the impacted second molar found in the 40-49 years and 50-59 years age groups (0.25 %). The association between the age and the type of incidental findings were found to be statistically not significant ($p > 0.05$). Not many authors have studied the association between age and type of incidental findings. Found bone lesions to be the common incidental finding which included cemento-osseus dysplasia and condensing osteitis. This is in contrast to the current study where both the findings were not found.²⁹⁻³³



CONCLUSION

The current study revealed a significant amount of incidental findings in the panoramic radiographs of orthodontic patients. Impacted third molars and enostoses were common findings and these findings have their respective clinical significance. A thorough review of all radiographic images will ensure early diagnosis and management of incidental pathologies while a good documentation of significant anatomical variations will provide important preoperative information. Hence more studies on different aspects of these incidental findings provides more information and understanding for a better diagnosis and treatment planning of patients.

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