



## INCIDENTAL FINDINGS IN MAXILLOFACIAL REGION: A RADIOGRAPHIC STUDY BY USING OPG

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### ABSTRACT

This radiographic study was done in order to report the incidental findings in North Indian population using OPG as radiographic modality in patients who came with other dental complain with total time duration of one year from october 2015-october 2016. A total of 1045 OPG were analyzed by two observer separately, out of which 134 radiographs showed incidental findings with total number of 29 varieties of orofacial abnormalities. Out of 29 varieties, 14(48.28%) affected mandible, 10 (34.49%) varieties of abnormalities affected maxilla, 2(6.9%) abnormalities affecting both maxilla and mandible and 3(10.34%) other bony and soft tissue findings. Most common type of dental pathology is asymptomatic impacted mandibular third molars i.e 31(23.13%) cases and least common are antrolith, calcified lymph node and condylar hypoplasia as only single case of each pathology was detected. The decision of choosing of OPG as radiographic modality is based on the fact that orthopantomography is still widely used radiographic technique and includes wide range of orofacial structures.

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### INTRODUCTION

The indications of radiograph in diagnosis comes only after clinical examination of patient. Radiographs helps in making final diagnosis as well as treatment planning of the disease. Commonly used radiographic modalities are intraoral radiographs and when a large area is examined, extraoral radiograph are usually prescribed. Most common extraoral radiograph prescribed by clinicians is orthopantomograph (OPG) as it includes almost whole of maxilla and mandible along with other surrounding tissues. Incidental findings seen on radiographs are referred as abnormalities that are normally not experienced by the patient but are hidden inside the bone or soft tissues and detected only after any radiographic technique used for diagnosis of other chief complain.<sup>1</sup> Incidental findings on radiographs can be intraosseous or extraosseous in the soft tissue. Interpretation of radiographs not only includes the examination of diseased portion but should also includes the other normal parts of radiographs. Incidental findings may be in the form of abnormality or just a variation of normal morphology. The severity of disorder can be non lethal to asymptotically damaging surrounding normal tissues. The incidental findings helps in diagnosis of

disease in early stage which improves prognosis, less treatment time and less morbidity.<sup>2</sup>

This type of study helps in providing information of many different abnormal cases and only few studies have been done on recording the incidental findings on radiographs.

#### Aims and Objectives

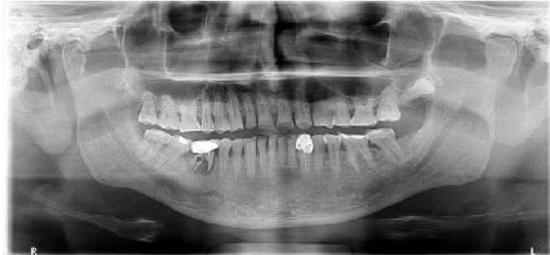
The aim of this study is to detect the presence of abnormal radiographic incidental findings in North Indian population by using orthopantomography (OPG).

### MATERIALS AND METHODS

This radiographic study was done in a duration of one year from October 2015-october 2016. A total of 1045 OPG were analyzed by two observers along with patients chief complaint, out of which 134 radiographs showed incidental findings. Two observers were used to screen the radiograph in order not to overlook any abnormal finding. Some of the radiographic findings are showed in figures (1-13) below.



**Fig 1** Retention Pseudocyst of left maxillary sinus



**Fig 2** impacted upper third molar in inverted position



**Fig 3** Supernumerary impacted mandibular premolar and bilateral mandibular third molar mesioangular impaction



**Fig 4** Ditoangular impacted maxillary third molar in right side, buccolingually impacted left maxillary third molar



**Fig 5** Bilaterally mandibular canal anterior loop



**Fig 6** Periapical radiolucent lesion w.r.t 37



**Fig 7** Calcified lymph node left side



**Fig 8** bilateral tonsilloliths



**Fig 9** Bilateral elongated styloid process



**Fig 10** Antrolith left maxillary sinus



**Fig 11** Dentigerous cyst (right mandibular body)



**Fig 12** Stafne cyst at right side of mandible



Fig13 Radicular cyst w.r.t 22,23

**Inclusion criteria**

Only cases of asymptomatic unusual incidental radiographic findings were recorded along with chief complaint of the patient.

**Exclusion criteria**

- Dental caries, root canal treated teeth, tooth extraction regions and symptomatic impacted teeth were not included in screening procedure.
- Bone loss due to periodontal diseases were not included in study.
- Symptomatic lesions were excluded like infected radicular cyst, expansion of bony cortices.

**RESULTS**

All the patients in this study were included after fulfilling the eligibility criteria and were advised OPG according to their chief complaint, for example in cases of periodontal diseases, multiple caries and multiple missing teeth etc. A total of 1045 OPG were evaluated by two observer in order to not to miss any radiographic findings. Out of 1045 radiographs only 134 radiographs showed abnormal incidental findings and 29 different types of dental diseases. Out of 134 abnormal radiograph, 79 (58.96%) detected in mandible, 44 (32.84%) seen in maxilla and 11(8.2%) seen in other surrounding structures. Out of 134 cases 64(47.76%) bony findings, 47(35%) dental findings and 23(17.16%) were seen in soft tissue and air spaces.

**Table 1**

Types of abnormality	No. of cases	Percentage
Impacted mandibular third molars	31	23.13%
Periapical radiolucent lesions	26	19.4%
Impaction maxillary third molar	10	7.4%
Periapical radiopaque lesions	8	5.9%
Anterior loop of inferior alveolar canal	8	5.9%
Maxillary sinus haziness	7	5.2%
Excessive pneumatization of maxillary sinus floor	6	4.5%
Elongated styloid process	6	4.5%
Impacted maxillary canine	5	3.7%
Retention pseudocyst/polyp of maxillary sinus	4	2.9%
Calcified lingual tonsil	4	2.9%
Radicular cyst	3	2.2%
Uncalcified follicle of third molar	3	2.2%
Malunion of parasymphseal fracture	2	1.5%
Dentigerous cyst	2	1.5%
Stafne cyst	2	1.5%
Tmj ankylosis	2	1.5%
Condylar hypoplasia	1	0.7%
Calcified submandibular lymph node	1	0.7%
Antrolith	1	0.7%
Large bony defect after extraction	1	0.7%
Supernumerary mandibular premolar	1	0.7%

The total number of different varieties of dental disorders were 29 and maximum number were seen in mandible i.e 14(48.28%) followed by maxilla i.e 10(34.49%), 2 (6.9%) types of abnormalities seen both in maxilla and mandible and 3(10.34%) seen in other surrounding tissues.

Most common radiographic incidental finding was mandibular impacted third molars which was seen in 31 cases (23.13%) followed by periapical radiolucent lesions which was seen in 26 cases(19.4%) and least common findings are antrolith, calcified lymph node and condylar hypoplasia as only single cases were recorded. Table 1 shows the number of cases detected of a particular disorder and their percentage.

Impacted third molar which were recorded in both maxilla and mandible are further categories according to their relative position in the alveolar bone are given in table 2.

**Table 2**

Impacted Mandibular third molar				Impacted Maxillary third molar			
Mesially tilted	Distally tilted	Bucco-lingually	Vertically	Mesially tilted	Distally tilted	Bucco-lingually	Vertically
20 cases (64.5%)	8 cases (25.8%)	1 case (3.2%)	2 cases (6.5%)	4 cases (40%)	3 cases (30%)	1 case (10%)	1 case (10%)

**DISCUSSION**

The abnormal incidental findings on radiographs are either found in bone or in soft tissues that can represent as radiopaque, radiolucent or mixed lesions and can be associated or originate from teeth, bone or soft tissues. These findings are found in routine radiographic evaluations that are necessary for the diagnosis of chief complaint of the patient.

A large population of individuals may have one or more dental impactions. The prevalence and types of impactions vary in different racial and ethnic groups. These may be due to racial genetic characteristics, inbreeding as well as epi-genetic factors such as food habits. It is therefore important to understand the pattern of impactions in various communities and population sub-groups.

Our study showed the prevalence of impacted mandibular third molar was 23.13% in which most of cases were mesially tilted (64.5%), followed by distally tilted (25.8%), vertical impacted in 6.5% and 3.2% are buccolingually placed where as maxillary impacted third molar seen in 7.4% of population, out of which mesially tilted impaction contributes 40%, followed by distally tilted (30%), vertical impacted in 10%, 10% are buccolingually placed and inverted in 10% of cases. Ajay Kumar Pillai (2014) evaluated impacted third molars with higher frequency of vertical position (46.6%) followed by mesioangular (28.2%), distoangular (16.74%), horizontal (7.69%) and other inverted (0.6%). In maxillary arch, the most frequent impacted third molar was found to be in vertical angulation (67.4%) which is followed by 15.2% in distoangular impaction, 10.9% of mesioangular impaction and 6.5% in horizontal impaction.<sup>3</sup> Studies done on prevalence of impacted mandibular third molar by Obiechina *et al*, Morris, Nanda *et al*, Sandhu *et al*, Schersten and Haidar *et al* showed higher prevalence than our study and Stephen showed lower results but Hattab *et al* showed results in accordance to our study.<sup>3</sup>

The second most common incidental findings was periapical radiolucent lesions that is shown by 19.4% of cases that are asymptomatic to the patients excluding periapical cysts which is seen in 2.2 % of cases and periapical radiopaque lesion seen in 5.9% of cases.

Prevalence of anterior loop of mandibular canal in our study was detected in 5.9% of cases which is smaller than the study done by Pontual and Ramos-Parez that showed in 41.6%. The high prevalence may be due to fact that this particular study is done on CBCT.<sup>4</sup> Another study done by Kaya Y *et al* 2008 showed prevalence of loop in 28% of cases on panoramic radiograph<sup>5</sup>

The maxillary sinuses are of particular importance to dentist because of their proximity to dental structures. Antral polyp rarely causes any signs or symptoms and is often noticed as an incidental finding on radiographs made for other purposes. It usually requires no treatment because they resolve spontaneously without any residual effect on the antral mucosa and periodic follow up may be required.<sup>3</sup> Our study showed maxillary sinus haziness in 5.2% of cases and retention pseudocyst/polyp of maxillary sinus in 2.9% of all incidental findings. Study done by Dr. Allan G. Farman showed prevalence of maxillary sinus mucosal retention cyst was around 5% and justified that the prevalence may be increased or decreased due to external environmental conditions and climate changes.<sup>6</sup> Drumond JP *et al* 2016 recorded the prevalence of maxillary sinus diseases in 59.97% of cases in which focal mucoperiosteal thickening seen in 21.25%, polypoid lesions in 10.76%, chronic sinusitis in 7.48%, neoplasm in 2%, other bony lesion or foreign body in less than 1% of cases.<sup>7</sup>

Our study recorded Dentigerous cyst and Stafne bone cyst as incidental findings in only 1.5% of patients. A dentigerous cyst is formed as a result of fluid accumulation in the reduced enamel epithelium surrounding an unerupted tooth. These cysts typically present as well defined pericoronal radiolucencies either superior or lateral to the unerupted tooth. Stafne cyst is thought to be a normal anatomical variant created by ectopic salivary gland tissue. Ramesh and Pabla<sup>8,9</sup> found dentigerous cyst and Stafne bone defect as an incidental findings on a dental radiograph. Abnormal calcification were recorded in our study that included calcification of styloid process in 6(4.5%) cases, calcified lingual tonsil in 4(2.9%) cases, antrolith in 1(0.7%) and calcified lymph node in 1(0.7%). Vengalath *et al* (2014) evaluated the calcification of soft tissues on OPG which showed calcified stylohyoid ligament in 4.2% of cases, tonsilolith in 3.2% of cases and lymph node in 2.1% of cases.<sup>10</sup> TMJ ankylosis is one of the most common pathologies afflicting the facial skeleton, it is most under managed disorders of TMJ. In our study the TMJ ankylosis in 1.5% of cases and condylar hypoplasia in 0.7% of patients. Study done by Gupta VK *et al* (2012) in Lukhnow showed a significant prevalence of TMJ ankylosis with ratio of 0.46/1000 children.<sup>11</sup>

Thus, the recorded data revealed the fact that the radiologist should not only focused on characteristic findings of the pathological conditions that are related to the chief complaint of the patient but also analyze abnormal incidental findings as it is helpful in early diagnosis of diseases that in turn results in better prognosis.

## CONCLUSION

In this particular study, various incidental findings in this radiographic study were detected among which dental findings were the recorded more common than bone findings. Most common incidental finding was impacted mandibular third molar that were asymptomatic to the patient followed by periapical radiolucent lesions. Only single case of condylar hypoplasia, calcified lymph node, antrolith and supernumerary impacted mandibular premolar was detected. Hence, the detailed and elaborate reports prepared by oral and maxillofacial radiologists may put forward many hidden aspects, which can simply be overlooked by clinicians.

Therefore, by applying a step by- step analytic protocol in a systematical order to enhance the detection of all radiographic abnormalities. A thorough review of radiographic images will help in early diagnosis and management of incidental pathologies with good prognosis.

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