

Research Article

Comparative Assessment and Correlation of Dental Pathologies between Clinical and Radiographic Examination –An Observational Study

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Keywords

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- Dental disease
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Abstract

Background: Panoramic radiography is a widely used two dimensional extra oral radiographic technique for detection of dental diseases, jaw pathologies and other systemic diseases. This study investigates the use of this technique as a routine screening procedure to detect hidden pathologies that may go undiagnosed clinically.

Methods: One hundred patients who visited dental opd were selected for the study. SPSS Version 19.0 was used for statistical Analysis. Data was analyzed using Chi-Square Test and correlation between clinical and radiological findings was assessed by and co relational regression analysis.

Result: Statistically significant amount of additional pathologies were detected on panoramic radiograph

Conclusion: Panoramic radiograph can be used as a screening tool to detect additional or hidden pathologies supplementary to visual clinical examination.

ABBREVIATIONS

OPG: Orthopantomogram; μ Sv: Microsevert; TK: Tejas Kulkarni

INTRODUCTION

Appropriate Diagnosis is important to plan and execute the treatment. Usually clinical examination of an oral cavity helps the dental practitioner to diagnose the dental pathology, however to understand severity of the disease radiographs are advocated.

In dentistry intraoral radiograph is most important in dental diagnosis; however an intraoral radiograph is somewhat limited in its overall coverage of the maxillo-mandibular structures. Conventional extra oral radiographs achieve better coverage, but are frequently plagued by distorted images, lack of definition & superimposition of anatomic structures. Panoramic radiography overcomes most of these limitations.

Panoramic radiography is a simplified extra oral procedure which allows examination of entire dentition, jaw bone, Temporomandibular joints and adjacent structures on a single film [1]. Since its introduction into the general practice of dentistry in the early 1960s, panoramic radiography has gained considerable popularity as a diagnostic tool [2].

Early diagnosis of hidden orofacial pathologies using panoramic radiography plays a very important role in clinical dentistry include not only correlation with the clinical findings but also helps patients to seek prompt treatment for incidental findings that are not seen clinically.

Considering this the radiation dose involved in the panoramic radiograph (9-26 μ Sv which is very low as compared to 171 μ Sv and 35 μ Sv using rectangular and round collimator for complete intraoral film mouth survey of using F speed film) (1) and its diagnostic yield, routine examination by panoramic radiograph on the initial clinical visit may be useful screening tool in early detection of various pathologic and incidental findings.

Very few studies have been conducted to show importance of opg for routine screening, this provided us an impetus to carry out this study.

MATERIALS AND METHODS**Data collection**

Study setting: Patients who reported to the department of Oral Medicine and Radiology were screened randomly by

panoramic radiograph between Jan 2015-March 2015 by the principal investigator (TK).

Eligibility criteria: Inclusion: patients visited dental opd for dental diseases

Exclusion: Pregnant women (1st and 3rd trimester)

Patients not willing to give consent were excluded.

Calibration: Standardization and calibration of the principal investigator for clinical examination and radiographic interpretation was done at Dept of oral medicine and radiology under the supervised guidance of head of the department.

After obtaining the written informed consent, randomly patients were subjected to OPG examination in digital Orthopantomograph machine, CS 8000 keeping standard parameters at 73 kVp, 12mA, 13.9 sec for adult and 71kVp, 10mA, 13.2 sec for child. Panoramic radiography was performed with the patient in a standing position & the mandible placed on the chin rest of the machine. Frankfort's horizontal plane, sagittal plane and canine line adjusted by laser guidance. The radiographs obtained on computer screen were carefully evaluated for the presence of any hidden dental pathologies.

Sample size: Based on the pilot study, 30% of patients were advised intraoral radiography to confirm clinical diagnosis, with level of significance at 95%, Power of study 80%, we calculated the sample size using formula $4PQ/L^2$, the sample size was estimated to be 100. Data was collected, compiled, tabulated and subjected for statistical analysis .SPSS Version 19.0 was used for statistical Analysis, quantitative data was analyzed using Chi-Square Test and correlational regression analysis was employed for assessing correlation between clinical and radiological findings.

RESULT

The overall findings or pathologies that were seen on panoramic radiographs included dental caries, impaction, elongated styloid process, congenitally missing teeth, root piece, periapical pathology, retained deciduous teeth, pulp stones, root canal treated teeth, fixed partial denture, periodontal bone loss, altered tooth/root morphology, sinus pathology, idiopathic sclerosis, rotation/transposition, altered condylar morphology and benign tumor.

79 patients out of 100 on OPG had one or more finding/pathology. Prevalence of congenitally missing tooth was highest (Table 1 and Figure 1). Prevalence of pulp stone was highest amongst incidental or additional findings followed by elongated styloid process that were seen on opg (Table 2 and Figure 2). 12 patients had impaction and periapical pathologies that were missed on clinical examination due to asymptomatic nature. 9 additional caries findings also recorded on opg that were unable to detect only on clinical examination. 12 altered condylar morphologies, 5 idiopathic sclerosis, 2 sinus pathologies and 1 benign tumor recorded on opg though all these were asymptomatic (Table 3 and Figure 3).

DISCUSSION

The present study was carried out to asses any missing dental pathologies during routine dental examination using panoramic

Table 1: Prevalence of Overall Findings/Pathologies on Opg Examination.

Overall finding/pathologies	Number	Prevalence (%)
Dental caries	26	26
Impaction	28	28
Elongated styloid process	14	14
Missing teeth	31	31
Root piece	10	10
Periapical pathology	12	12
Over retained teeth	5	5
Pulp stone	19	19
Rc treated teeth	11	11
Fixed partial denture	5	5
Periodontal bone loss	17	17
Altered morphology (tooth/root)	4	4
Sinus pathology	2	2
Idiopathic sclerosis	5	5
Rotation/transposition	3	3
Altered condylar morphology	9	9
Benign tumor	1	1

NOTE: 79 patients out of 100 on OPG had one or more finding/pathology.

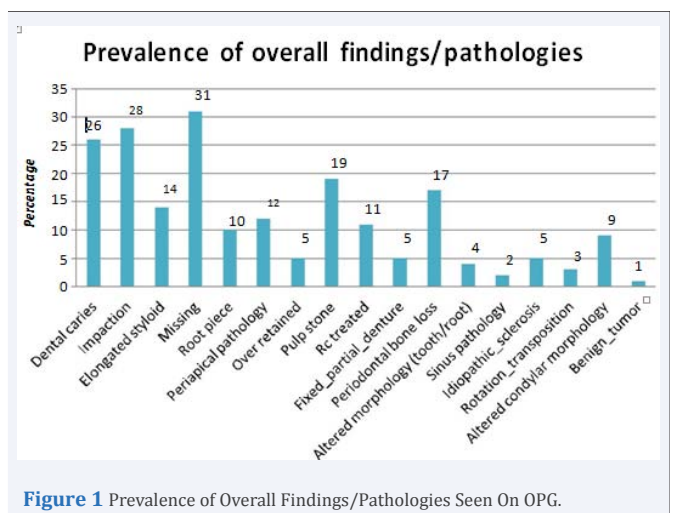


Figure 1 Prevalence of Overall Findings/Pathologies Seen On OPG.

radiograph. We used opg for identifying hidden pathologies over full mouth intraoral periapical radiographs as opg had advantages of wide coverage of arches, less radiation exposure, simplicity in operation and patient convenient.

Congenitally missing teeth (31%) was the most common radiographical finding observed in the present study, probably disturbance during amelogenesis, missing permanent counterpart might be the reason. Moreover polygenic mode of inheritance with epistatic gene and environmental factors might influence teeth missing congenitally [3-6]. These findings are similar to the study conducted by santosh patil [7].

When patients were subjected for routine radiographic examination it was observed that 12% of patients had impacted teeth, this clearly suggest the importance of advising opg for detecting impacted tooth. Apart from detecting the impaction, opg helps to diagnosis any periapical, pericoronal pathologies,

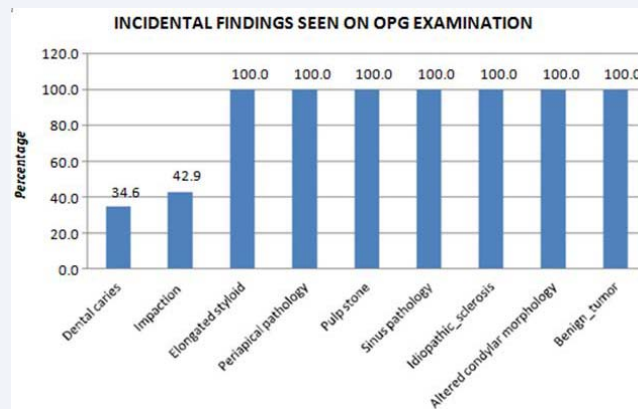


Figure 2 Incidental findings seen on OPG examination.

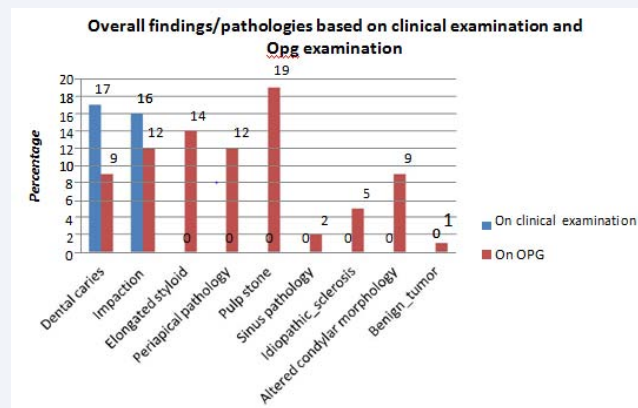


Figure 3 Prevalence of Findings/Pathologies Based on Clinical Examination and incidental/additional findings on OPG Examination.

Table 2: Incidental Findings Seen on Opg Examination.

Finding/pathologies	Number of Patients	On OPG(incidental findings)	Percentage
Caries	26	9	34.61
Impaction	28	12	42.85
Elongated styloid Process	14	14	100%
Periapical pathology	12	12	100%
Pulp stone	19	19	100%
Sinus pathology	2	2	100%
Idiopathic_sclerosis	5	5	100%
Altered condylar Morphology	12	12	100%
Benign_tumor	1	1	100%

cyst, angulation of impacted teeth, etc that will help to accurately plan the for disimpaction. This is in agreement with the study conducted by Shah RM, Grover PS and Thilander P [8-10].

Clinically it is difficult to detect the pulp stones and it was observed in our study 19% of patients had pulp stones. These findings help to overcome the difficulties during endodontic treatment. This accidental pulp stone detection also helps to assess patients systemic health condition like Hypertension, and coronary artery condition and thus underlines the importance of opg in dental health care [11].

Elongated Styloid process was seen in 14% of patients and

may be associated with series of symptoms such as foreign body sensation in throat, pain in rotating head, vertigo ,facial pain, headache, trismus and tinnitus. Opg could be advised in suspected origin of pain in tonsillar or pharyngeal region, as many earlier studies have reported the significance of detecting elongated styloid process in overcoming dilemma between pain of dental or muscular origin .This finding is similar to the studies conducted by Chandramani et al. [12], advocating opg in patients with pain in tonsillar region, neck region, and difficulty in swallowing is justified to rule out the elongated styloid process

Choi [13], in his study reported caries detectability of clinical examination in occlusal and buccolingual surface was

Table 3: Comparison between Findings/Pathologies Based on Clinical Examination and Incidental/Additional Findings on Opg Examination.

Overall finding/pathologies	Number of patients	On clinical examination	On OPG (incidental/ additional findings)	p-value	Remarks
Caries	26	17	9	P=0.02	Significant
Impaction	28	16	12	P=0.26	Not Significant
Elongated styloid	14	0	14	P<0.0001	Significant
Periapical pathology	12	0	12	P<0.0001	Significant
Pulp stone	19	0	19	P<0.0001	Significant
Sinus pathology	2	0	2	P=0.49	Not Significant
Idiopathic sclerosis	5	0	5	P=0.05	Significant
Altered condylar Morphology	12	0	12	P<0.0001	Significant
Benign tumor	1	0	1	1	Not Significant

higher than that of panoramic examination, however it was statistically insignificant. In proximal surface, caries detectability of panoramic examination was higher than that of clinical examination, and it was statistically significant. When the two examination methods were combined, additional detection of caries was possible 33 (48.2% in proximal). This was favouring our study where 9 % of the detected caries were incidental findings and all were proximal/ root caries

CONCLUSION

To conclude, although panoramic radiograph should not be used to replace visual clinical examination, this study showed that many dental findings like caries, impaction, periodontal bone loss, altered tooth and root morphology etc and jaw bone pathologies/findings like sinus pathology, presence of benign tumor, elongated styloid process, sclerosis etc could be detected on panoramic radiograph. Early detection of these pathologies or findings could result in good treatment outcome and will improve overall oral health status of the patient and will Thus it can be a valuable tool in screening of a mass population.

Within the limitation of our study, it was observed it's wise to advice OPG routinely in dentistry as many undetected dental pathologies could be diagnosed .this helps not only in diagnosing dental diseases but many associated systemic conditions. Opg could be an alternative diagnostic tool for differentiating pain between dental and systemic origin.

REFERENCES

- White SC, Pharoah MJ, editors. Oral Radiology, Principles and Interpretation. 6th edn. St. Louis: Mosby, 2011.
- Langland OE, Langlais RP. Panoramic Radiology, 2nd edn. Lea & Febiger. 1989.
- Badrov J, Lauc T, Nakaš E, Galić I. Dental Age and Tooth Development in Orthodontic Patients with Agenesis of Permanent Teeth. *BioMed Res Int.* 2017; 8.
- Abdalla EM, Mostowska A, Jagodziński PP, Dwidar K, Ismail SR. A novel WNT10A mutation causes non-syndromic hypodontia in an Egyptian family. *Arch Oral Biol.* 2014; 59: 722-728.
- Pawlowska E, Janik-Papis K, Poplawski T, Blasiak J, Szczepanska J. Mutations in the PAX9 gene in sporadic oligodontia. *Orthodont Craniofacial Res.* 2010; 13: 142-152.
- Dreesen K, Swinnen S, Devriendt K, Carels C. Tooth agenesis patterns and phenotype variation in a cohort of Belgian patients with hypodontia and oligodontia clustered in 79 families with their pedigrees. *Eur J Orthod.* 2014; 36: 99-106.
- Patil S, Doni B, Kaswan S, Rahman F. Prevalance of dental anomalies in Indian population. *J Clin Exp Dent.* 2013; 5: 183-186.
- Shah RM, Boyd MA, Vakil TF. Studies of permanent tooth anomalies in 7,886 Canadian individuals. I: impacted teeth. *Dent J.* 1978; 44: 262-264.
- Grover PS, Lorton L. The incidence of unerupted permanent teeth and related clinical cases. *Oral Surg Oral Med Oral Pathol.* 1985; 59: 420-425.
- Thilander B, Myrberg N. The prevalence of malocclusion in Swedish school children. *Scand J Dent Res.* 1973; 81: 12-21.
- Nayak M, Kumar J, Prasad LK. A radiographic correlation between systemic disorders and pulp stones. *Indian J Dent Res.* 2010; 21: 369-373.
- More CB, Asrani MK. Evaluation of the styloid process on digital panoramic radiographs. *Indian J Radiol Imaging.* 2010; 20: 261-265.
- Choi JW. Assessment of panoramic radiography as a national oral examination tool: review of the literature. *Imaging Sci Dent.* 2011; 41: 1-6.

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