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A Study Explores Pediatric Dentist's Opg Prescription Prevalence, Knowledge, Attitude, And Practices Across Maharashtra, India

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Abstract

Background: Panoramic radiography is widely used in pediatric dentistry for comprehensive assessment of dental and maxillofacial structures. However, variability in prescription practices and awareness of radiation safety principles necessitates evaluation of pediatric dentists' knowledge, attitude, and practices regarding orthopantomogram use in children. **Aim:** To evaluate the Prevalence of prescribing Orthopantomogram (OPG) in children by Pediatric Dentists. **Material and Methods:** The study was a survey-based study. A questionnaire was distributed to Pediatric Dentists from State of Maharashtra in a google form format. Responses to the google form were collected, analyzed and results were drawn. Chi-square test was done to statistically analyze the data, and the significance level was set at 0.05. **Result:** OPG is prescribed for 5-10 times a month by pediatric dentists with more than 35 years of age which showed statistically significant difference. Not only age of dentists but the results based on years of experience were also statistically significant. **Conclusion:** According to this study, there is no adherence to the American Academy of Pediatric Dentistry guidelines regarding radiographic examination in child and best quality OPG machine should be incorporated in practice along with additional training for Pediatric dentists to get the best diagnostic tool for precise planning and smooth examination method in children.

Keywords: Orthopantomogram, Pediatric Dentist, Dental radiography.

INTRODUCTION

Dental radiography is a useful diagnostic technique that frequently enhances clinical evaluation. For pediatric patients, a thorough and precise diagnosis and treatment plan depend heavily on radiographic evaluation. The radiographic techniques include extraoral and intraoral radiography. OPG is an extra oral technique. OPG's are widely used in pediatric dental practice, as they offer the ability to capture both maxillary and mandibular teeth as well as surrounding structures and tissues in one image^[1]. It limits the radiation field to the specific area of concern and reduces radiation exposure when the lowest radiography settings are employed. As a minimum prerequisite to guarantee a suitable image quality, the patient must cooperate well, which includes being able to follow directions and staying motionless for the necessary exposure duration^[2]. When prescribing radiographic examinations for children, the former must be well justified and explicitly stated, stating that any expected results from the imaging could not have been achieved using other, less dangerous techniques^[2]. OPG's and other imaging modalities are chosen based on certain standards pertaining to the age, medical history, and clinical examination of each patient. The imaging modality's diagnostic efficacy in relation to the sickness process under investigation should serve as the foundation for the selection criteria^[1]. Dental professionals should be aware of the risks involved with dental imaging and should utilize the capabilities of contemporary dental imaging equipment because pediatric clinical situations require high-quality diagnostic accuracy^[2,3].

Also, The American Academy of Pediatric Dentistry (AAPD) intends recommendations to help practitioners make clinical decision concerning appropriate selection of dental radiographs as part of an oral evaluation of infants, children, adolescents, and individuals with special health care needs. These recommendations can be used to optimize patient care, minimize radiation burden, and prudently distribute medical resources^[1].

Most of the pediatric dentists prefer to use OPG as their first option as, due to their noninvasive nature, the majority of kids can handle it with ease. Additionally, it offers thorough details about the dentomaxillofacial area, including both erupted and unerupted teeth, emerging dental bacteria, a variety of dental anomalies in both jaws, dental abnormalities and uncover unrelated discoveries to a patient's chief complaint as these findings become particularly crucial for youngsters, since some long-term lesions and maxillofacial

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abnormalities may develop psychological issues if treatment is delayed. Using OPG's as a supplement to the clinical examination in national oral examination might enhance the public oral health too [4].

Dentists should be concerned about the radiation dose and exposure while exposing children to radiographs and always follow three basic rules of safe radiation exposure, which are justification, limitation and optimization [5]. These days, majority of recently constructed panoramic units come with built-in features specifically designed for low radiation with quality image [1]. For patients who are unable to remain motionless for an OPG exposure, several manufacturers offer a fast-scanning mode of the scanner [1].

Thus, in order to analyze the knowledge, attitude, practices, and prevalence of OPG prescriptions by pediatric dentists in children, this questionnaire survey was conducted.

The aim of the present study was to evaluate the Knowledge, Attitude, Practices and Prevalence of Orthopantomogram prescriptions by Pediatric Dentists in Children.

MATERIALS AND METHODS

Ethical approval

Ethical approval for this survey was obtained from the Institutional Ethical Review Board Committee and protocol approval number was TDC/EC/07/2025.

Study Design and Data Collection

The present study was a questionnaire-based study. The implementation was done using google forms which were distributed to Pediatric Dentists from the State of Maharashtra. Participation was voluntary and anonymous.

The questionnaire was validated by specific group of Pediatric Dentists and changes were made accordingly. The questionnaire comprised of 20 questions in a multiple-choice format based on the knowledge, attitude, practice, and prevalence of pediatric dentists on the prescription of OPG in children. Responses to the google form were collected, analyzed and results were drawn.

Statistical Analysis

Data was collected and tabulated in google sheets. The power was calculated at a 95% confidence interval and the results were statistically analyzed using IBM SPSS software. (SPSS Inc., Chicago, IL, USA) version 9.0. Chi-square tests were done to statistically analyze the data, and the significance level was set at 0.05.

RESULTS

In this study responses were collected from Pediatric dentists from the State of Maharashtra, out of which 251 dentists were with age of >35 years while 59 dentists were with age of <35 years.

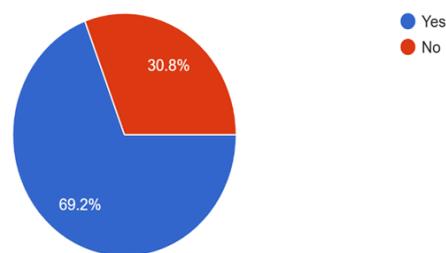
The most common source of updating the knowledge regarding OPG was conferences, CDE programs and articles for pediatric dentists <35 yrs of age while it was books for the pediatric dentists with >35 years of age. OPG is prescribed for 5-10 times a month by pediatric dentists with more than 35 years of age which showed statistically significant difference. Not only age of dentists but the results based on years of experience of individual pediatric dentist were also statistically significant. The AAPD Guidelines are entirely at odds with the fact that 81% of pediatric dentists continue to use IOPA radiographs as a supplemental radiographic examination tool. The primary clinical indication for OPG use differed for each dentist with a number of years

of expertise as well as with age; this difference was statistically significant too.

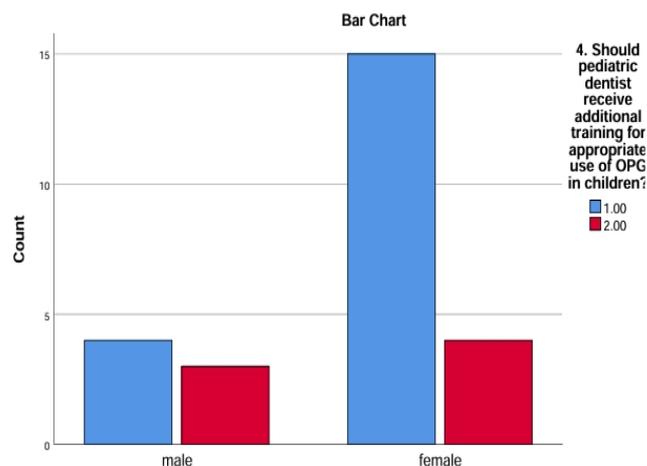
47.2% of Pediatric dentist with less than 5 years of experience are moderately confident about the knowledge of radiation hazard, radiation exposure and radiation protection while 30 % with more than 10 years of experience . Prescription of OPG's for routine examination is significantly increasing over days. Prescription of OPG's for recall visits shows statistically significant difference based on the age of Pediatric dentist.

AI (Artificial Intelligence) uses deep learning networks to analyze OPG. However, 30.8% of Pediatric dentist are still unaware about using AI in radiological diagnosis and planning treatment plan (Figure 1A). Awareness about the use of AI varies with years of experience giving a statistically significant result. 73.2% Pediatric dentist choose to receive an additional training for appropriate use of OPG in children (Figure 1B). Also, 65.2% Pediatric dentist believe that OPG is not overprescribed in children.

Question	P value
What is your source of updating the knowledge regarding OPG radiographic modality?	0.000
How often do you prescribe OPG's in a month? (With respect to: Age)	0.000
How often do you prescribe OPG's in a month? (With respect to: Years of experience in Pediatric dentistry after post-graduation)	0.000
What are the primary clinical indications you prescribe OPG in children?	0.000
What do you use as a supplemental radiographic examination aid?	0.000



(a)



(b)

Figure 1: (A)- Pie chart representing 30.8% of Pediatric dentist are still unaware about using AI (Artificial Intelligence) in radiological diagnosis. (B)- Bar graph representing that 73.2% Pediatric dentist choose to receive an additional training for appropriate use of OPG in children.

What do you use as a supplemental radiographic examination aid?
responses

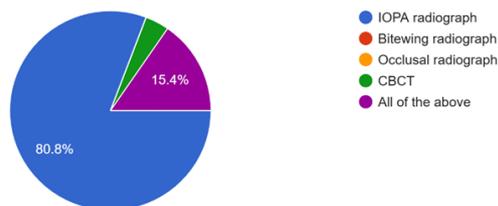


Figure 2: Supplemental radiographic examination tool

DISCUSSION

Treatment in the medical sciences is predicated on a proper diagnosis, which cannot be made just by clinical examination. Using radiographs is a crucial paraclinical diagnostic strategy. Recent developments in panoramic units have improved image quality, unique features, and research has demonstrated that employing collimated techniques can greatly reduce radiation exposure. White and Weissman (1977) [6] examined the rationale often cited for exposing screening panoramic radiographs; that is, the expectation that a significant number of lesions will be revealed by the panoramic radiograph that will not be revealed by intraoral projections. The objective of using radiographs should be to maximize diagnostic information while minimizing the radiation burden. Thus, the purpose of this survey was to evaluate the present state of Pediatric dentist's knowledge, attitudes, practices, and prevalence of OPG prescriptions [5].

In this study, 73.2 % of pediatric dentists suggested that they should receive an additional training_for appropriate use of OPG in children. Primary clinical indication for use of OPG varied for every pediatric dentists with varying years of experience, the difference here was statistically significant. The number of prescriptions written by dentists over 35 Years of age in a given month seems to be higher than that of dentists under 35 with statistically significant difference.

The most recent development in the modern world, brought about by the evolution of AI (Artificial Intelligence), is the use of deep learning networks to analyze OPG. Nonetheless, 30.8% of pediatric dentists are still ignorant of this, which must be taken into account [7].

It is crucial that patient feels comfortable throughout radiography exam. IOPA radiographs are still used as a supplemental radiographic examination tool by 81 % of pediatric dentists, which is completely against AAPD guidelines (Figure 2). Also, IOPA Film is not always accessible in size 0 and PSP Plates are difficult enough for Pediatric patients, thus OPG is a preferable option. Because intraoral imaging is often uncomfortable or causes significant discomfort, and because some children cannot handle it, OPG may be investigated. Additionally, OPG is the most effective main diagnostic technique for severe acute periapical or peri-coronal infections, abscesses with intra- and/or extraoral edema and potentially fever.

Because there was less direct contact with saliva during the COVID-19 pandemic, use of OPG was increased. This is still beneficial now. The most beneficial aspect of today's OPG is the automated examination of tooth anatomy and pathological situations [8].

OPG, besides clinical examination is helpful in detecting possible dental foci of infections before bone marrow transplantation (BMT). OPG is thought to be helpful in detecting generalized dental abnormalities, such as hyperdontia or hypodontia. A complete radiographic evaluation of the dental status is usually required in genetic illnesses, such as amelogenesis/dentinogenesis/osteogenesis imperfecta and syndromic patients with broad pathological conditions. OPG can perform this evaluation [9].

A dental examination with OPG may be used to find potential infection foci in individuals receiving significant medical treatment, such as bone marrow or organ transplantation. Rarely, juvenile dental patients will have pathological findings such cysts or tumors. OPG will make it possible to see a wider field of view if an IOPA reveals unusual structures or findings, such as radiolucent or radioopaque regions that cannot be explained by anatomy [10].

However, previously a study was conducted by Gandhi JM, Govindaraju L which concluded that usage of radiographic techniques, especially OPG's should be limited for children under 6 years of age unless absolutely necessary [11].

OPG's capacity to provide fine-grained pictures of the growing or deteriorating jawbones and dentition has led to its growing use for age assessment, especially in forensic science. As the deciduous teeth erupt (and are subsequently lost) in a predictable pattern, beginning with the mandibular central incisors as early as 6 months of age and ending with the second molars near 3 years of age, a dental age can be determined from a panoramic radiograph, similar to the method of determining a bone age from a hand radiograph [12].

Age estimation is of wider importance in forensic medicine, not only for the purpose of identifying deceased victims but also in connection with crimes and accidents. Tooth formation is used often to assess maturity and predict age. Within clinical dentistry, this information aids in diagnosis and treatment planning. The approach is based on examining how skeletal and dental development changes as people's age. In order to establish age groups and make age estimations in accordance with them, OPGs also offer information about an individual's identity and other age-related characteristics, such as periodontal recession, cementum annulations, root resorption, enamel attrition, and secondary dentine in the pulp [13]. Measurements of the quantity of secondary dentin present appear to be a somewhat good way to estimate age. In fields like forensic medicine and forensic dentistry, age estimation with OPGs can be used to generate a sizable proportion of projections, particularly for young patients [13]. Radiographic tests must be performed in addition to millimetric measurements of the teeth in order to obtain an accurate and trustworthy age estimate [13].

An OPG examination is a better option as the exposure time is approx.08 mSv (roughly 1/3rd of dose from full mouth survey_of intraoral film), protective equipment is used for both the operator and the child patient, and collimating devices are also included. The radiation dose is successfully decreased by FOV limiting (collimation). On an individual basis, the shortest FOV for the specified indication ought to be applied. [8].

Also, patient risk from a single OPG is to be "somewhat" less than that from a 21-film, full-mouth series [14]. The exposure dose can be decreased by using either manual intensity adjustment (mA) or automated exposure control. All of these adjustments have to be made consistently and with adequate therapeutic benefit on both an individual and indication-based basis.

All parameters are standardized, thus repetitive images can be taken for comparative research purposes. It helps patients with gagging and trismus by giving the youngster the most comfort possible. It is also a valuable aid for patient education. OPG is thought to be helpful in detecting mandibular or condylar fractures after dentomaxillofacial trauma [7]. Thus, the study demonstrated the positive aspects of OPG use as well as its value to pediatric dentists in terms of diagnosis and treatment planning. Considering the results of this study OPG is the better radiographic examination aid and it is recommended that specific guidelines for the use of OPG must be taken into consideration.

CONCLUSION

According to this study, there is no adherence to the American Academy of Pediatric Dentistry guidelines regarding radiographic examination in child. Best quality OPG machine should be incorporated in practice along with additional training for Pediatric dentists to get our best diagnostic tool for precise planning and smooth examination method in children. Awareness about the recent advances in radiographic technology must be spread at a larger scale amongst the Pediatric dentists.

Conflicts of Interest

The author reports no conflicts of interest.

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