Original Article

DOI: 10.7860/JCDR/2026/88372.24734

Dentistry Section

Incidental Orthopantomographic Findings in Paediatric Dental Care Among Children Aged 9-16 Years: Insights from a Retrospective Cross-sectional Study

POONACHA SOMANNA KOODAKANDI[1], SUSHIL BHAGWAN CHAVAN[2], BHAVNA DAVE[3], SEEMA BARGALE[4], ANSHULA DESHPANDE[5], PRATIK KARIYA[6], MRUNAL BORAWAKE[7]

BY-NC-ND

ABSTRACT

Introduction: Panoramic radiography is routinely used in paediatric dental practice to assess developing dentition and jaw structures. In addition to the primary diagnostic purpose, Orthopantomographs (OPG) often reveal incidental dental and maxillofacial findings that may remain clinically asymptomatic during childhood. Early identification of these findings is crucial for timely intervention and comprehensive treatment planning in paediatric patients.

Aim: To evaluate the incidental findings of dentofacial abnormalities and their importance in overall diagnosis and treatment planning for paediatric patients.

Materials and Methods: This retrospective cross-sectional study was conducted in the Department of Paediatric and Preventive Dentistry using archived panoramic radiographs retrieved from the Department of Oral Medicine and Radiology, K.M. Shah Dental College and Hospital, Vadodara, Gujarat, India, from August 2025 to January 2026. A total of 328 OPGs of children aged 9-16 years obtained over the previous 10 years were included in the study. The selected age group predominantly represented mixed and early permanent dentition stages. All radiographs were systematically evaluated for impacted teeth, supernumerary teeth, hypodontia, delayed eruption, structural anomalies, pulp/periapical pathologies, and other incidental abnormalities. Demographic parameters including age and gender were recorded. Data were analysed using Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics were used to calculate frequencies and percentages. Pearson's Chi-square test was used to assess associations between categorical variables. Fisher's-exact test was applied whenever more than 20% of cells had expected frequencies less than five. Statistical significance was set at $p<0.05$

Results: The mean age of participants was 12.2±2.53 years. Females constituted 172/328 (52.4%) and males 156/328 (47.6%) of the study population. Pulp or periapical pathologies were the most common incidental findings, observed in 42/328 (12.8%) radiographs, followed by hypodontia in 22/328 (6.7%), impacted permanent teeth in 18/328 (5.5%), fracture of teeth in 11/328 (3.4%), and supernumerary teeth in 8/328 (2.4%). Hypodontia showed a statistically significant association with gender ($p=0.045$), with higher prevalence among males. Impacted teeth ($p=0.041$), delayed eruption ($p=0.019$), and pulp or periapical pathologies ($p=0.005$) demonstrated significant associations with age groups.

Conclusion: Orthopantomographs frequently reveal clinically significant incidental findings in paediatric patients, with pulp or periapical pathologies and hypodontia being the most common abnormalities detected in the present study. Systematic evaluation of panoramic radiographs can facilitate early diagnosis and improve comprehensive treatment planning in paediatric dental practice.

Keywords: Dentition, Panoramic radiography, Paediatric dentistry, Tooth abnormalities

INTRODUCTION

Incidental findings of pathologies in radiology refer to occult abnormalities that show no clinical signs or symptoms but were detected in radiographs taken for some other purposes or an unrelated chief complaint. In dentistry, these may include tooth-related or intraosseous findings. Some of these findings may have significant consequences on the patient's health. Hence, a radiologist should not confine the focus to one particular region of the film/ image [1].

Panoramic radiography, also called panoramic X-ray or Orthopantomogram (OPG) 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 [2]. It is also known as a routine radiological diagnostic tool for examination since it uses relatively low doses of radiation, approximately 7 μSv as compared to a full mouth radiograph [3].

Various imaging techniques such as Intraoral Periapical View (IOPA), OPG, occlusal view, Computed Tomography (CT) scan, and Cone Beam Computed Tomography (CBCT) are used in dentistry, but OPG is considered a routine radiological diagnostic tool for examination since it uses relatively low doses of radiation as compared to a full mouth radiograph. OPG is useful to see multiple anatomical points in a single film, which is not possible in IOPA or occlusal view, and it's low-cost and easy availability also make it more acceptable than a CT scan, which gives better visualisation of structures by section [4,5]. The prevalence of incidental findings varies on OPG and Lateral Cephalogram (LC) [6].

Developmental dental anomalies are a vital category of dental pathology. Anomalies are relatively common, and previous studies showed that 36.7-40.3% of the study subjects displayed at least one dental anomaly; although genetic and environmental factors must be accounted for, the aetiology of most anomalies remains unknown [7,8].

In the general dentistry setting, more incidental findings in the dental and extra-dental region have already been observed on radiological images in older people [9,10]. Most Indian studies evaluating incidental findings on panoramic radiographs originate from Tamil Nadu, Chandigarh, and Karnataka, with relatively limited multicentric Indian data available [11-17].

The null hypothesis of the present study was that there would be no significant association between incidental OPG findings and demographic variables such as age and gender among children aged 9-16 years.

The alternative hypothesis was that a significant association exists between incidental OPG findings and demographic variables.

Also, despite the routine use of panoramic radiography in Paediatric dentistry, literature regarding incidental OPG findings among children from Gujarat, India, remains limited. Therefore, the present study aimed to provide regional epidemiological data on incidental radiographic findings in paediatric patients aged 9-16 years from Vadodara, Gujarat and to analyse their association with age and gender.

MATERIALS AND METHODS

This retrospective cross-sectional study was conducted in the Department of Paediatric and Preventive Dentistry using archived panoramic radiographs retrieved from the Department of Oral Medicine and Radiology, K.M. Shah Dental College and Hospital, Vadodara, Gujarat, India, from August 2025 to January 2026 after obtaining Institutional Ethics Committee approval (IEC approval number: SVIEC/ON/DENT/SRP/AUG/25/2).

Sampling formula: A non probability convenience sampling technique was used for selection of archived panoramic radiographs fulfilling the inclusion criteria.

$n=[DEFF \times N \times p(1-p)] / [(d^2/Z^2 1-\alpha/2 \times (N-1)) + p(1-p)]$

- p=0.765
- N=4,165,626
- Confidence level=95%
- Z=1.96
- d=0.05

Sample size was calculated using OpenEpi software based on the prevalence of incidental findings reported by Sridhar M et al., [15] (76.5%), with a 95% confidence interval and 5% margin of error. Considering the Paediatric population of Gujarat (4,165,626 according to Census data), the minimum required sample size was calculated to be 277. A total of 328 OPGs of children aged 9-16 years obtained over the previous 10 years were included in the study. This period represents late mixed dentition to permanent dentition stages, during which panoramic radiographs are commonly advised for evaluation of eruption patterns, dental development, orthodontic assessment, and detection of developing pathologies or anomalies.

Inclusion and Exclusion criteria: Radiographs of adequate diagnostic quality with complete demographic details were included for the study, while distorted radiographs, syndromic patients, and incomplete records were excluded from the study.

All radiographs were systematically evaluated for incidental dental and maxillofacial findings, excluding the chief complaint for which the radiograph had originally been taken.

Study Procedure

All panoramic radiographs were obtained using the same digital panoramic system (Carestream CS 9600). Radiographs were evaluated for incidental findings. Assessment of the parameters was done quadrant-wise; the assessed parameters included (impacted teeth, supernumerary teeth, hypodontia, crowding, tooth fractures, delayed eruption, cystic lesions, structural anomalies, sinus opacification, tmj abnormalities, jaw fractures, and pulp or periapical pathologies and any other abnormalities).

Examiner calibration and reliability assessment: To assess examiner calibration and minimise observer bias, 5% of the OPGs were randomly selected and independently evaluated by both the co-investigator and the principal investigator. Inter-rater reliability between the two examiners was assessed using Cohen's kappa statistic. Almost perfect agreement was observed for pulp pathologies (κ=0.883, p<0.001), while substantial agreement was found for impacted teeth and other dental anomalies (κ=0.638, p=0.005). Several findings demonstrated high observed agreement (94.1%-100%); however, kappa values could not be meaningfully calculated for rare or absent conditions because of insufficient variability in ratings. Overall, inter-examiner agreement ranged from substantial to almost perfect for evaluable variables. As no discrepancies were identified during the calibration exercise, the remaining OPGs were subsequently evaluated and assessed by the principal investigator.

STATISTICAL ANALYSIS

Data were analysed using IBM SPSS Statistics version 21.0. Descriptive statistics were used to calculate frequencies and percentages. Pearson's Chi-square test was used to assess associations between categorical variables. Results were tabulated in Median {Interquartile Range (IQR)} Fisher's-exact test was applied whenever more than 20% of cells had expected frequencies less than five. Statistical significance was set at p<0.05

RESULTS

A total of 328 OPGs of paediatric patients aged 9-16 years were evaluated in the present retrospective cross-sectional study. The mean age of the participants was 12.2±2.53 years, with a median age of 12 years (IQR: 10-14 years). Among the participants, 172/328 (52.4%) were females and 156/328 (47.6%) were males. Based on age distribution, 105/328 (32.0%) participants were aged ≤10 years, 73/328 (22.3%) were aged 11-12 years, 75/328 (22.9%) were aged 13-14 years, and 75/328 (22.9%) were aged ≥15 years [Table/Fig-1].

Age-wise comparison demonstrated statistically significant associations for impacted permanent teeth (χ^2=8.244, p=0.041), delayed eruption (χ^2=9.919, p=0.019), and pulp or periapical pathologies (χ^2=13.058, p=0.005) [Table/Fig-1].

Gender-wise comparison revealed a statistically significant association between hypodontia and gender (χ^2=4.021, p=0.045), with a higher prevalence among males (15/156; 9.6%) compared to females (7/172; 4.1%) [Table/Fig-2]. No statistically significant gender-based differences were observed for impacted teeth (p=0.449), supernumerary teeth (p=0.392), crowding (p=0.136), fracture of teeth (p=0.637), delayed eruption (p=0.309), structural anomalies (p=0.214), condylar joint space narrowing (p=0.340), pulp or periapical pathologies (p=0.747), or other anomalies (p=0.344).

Incidental radiographic findings were observed in both mixed and permanent dentition stages. Pulp or periapical pathologies were the most frequently detected incidental findings, observed in 42/328 (12.8%) participants. Hypodontia was identified in 22/328 (6.7%) participants [Table/Fig-3], while impacted permanent teeth [Table/Fig-4] were observed in 18/328 (5.5%) participants. Fracture of teeth was noted in 11/328 (3.4%) participants [Table/Fig-5] and supernumerary teeth [Table/Fig-6] were detected in 8/328 (2.4%) participants. Delayed eruption was observed in 7/328 (2.1%) participants. Structural dental anomalies such as dilaceration, fusion, and taurodontism were identified in 5/328 (1.5%) participants having permanent dentition [Table/Fig-7]. Other anomalies were observed in 6/328 (1.8%) participants [Table/Fig-8,9]. Crowding was present in 2/328 (0.6%) participants, while condylar joint space narrowing was observed in 1/328 (0.3%) participant. No cases of cystic

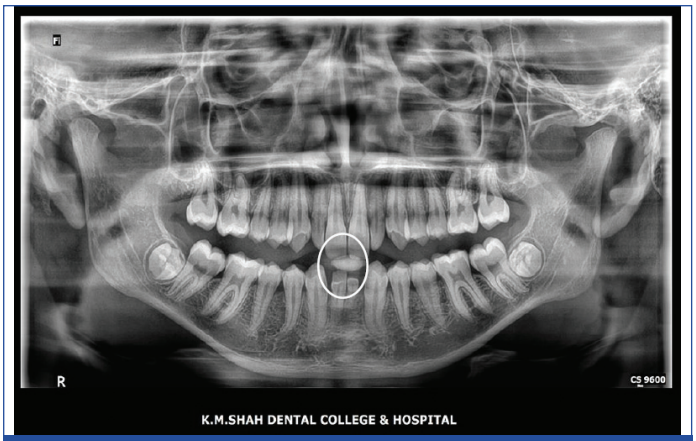
OPG findings	Categories	N	Age categories				χ^2	p-value
			≤10 years, n (%)	11-12 years, n (%)	13-14 years, n (%)	≥15 years, n (%)		
Gender	Female	172	60 (57.1)	36 (49.3)	30 (40)	46 (61.3)	8.249	0.041
	Male	156	45 (42.9)	37 (50.7)	45 (60)	29 (38.7)		
Impacted teeth (permanent teeth)	Absent	310	104 (99)	69 (94.5)	70 (93.3)	67 (89.3)	8.244	0.041
	Present	18	1 (1)	4 (5.5)	5 (6.7)	8 (10.7)		
Supernumerary (extra tooth)	Absent	320	103 (98.1)	72 (98.6)	73 (97.3)	72 (96)	1.261	0.738 *
	Present	8	2 (1.9)	1 (1.4)	2 (2.7)	3 (4)		
Hypodontia (missing teeth)	Absent	306	100 (95.2)	70 (95.9)	66 (88)	70 (93.3)	4.78	0.189 *
	Present	22	5 (4.8)	3 (4.1)	9 (12)	5 (6.7)		
Crowding (malocclusion)	Absent	326	104 (99)	72 (98.6)	75 (100)	75 (100)	1.82	0.611 *
	Present	2	1 (1)	1 (1.4)	0	0		
Fracture of tooth	Absent	317	103 (98.1)	72 (98.6)	72 (96)	70 (93.3)	4.203	0.24 *
	Present	11	2 (1.9)	1 (1.4)	3 (4)	5 (6.7)		
Delayed eruption of teeth	Absent	321	99 (94.3)	72 (98.6)	75 (100)	75 (100)	9.919	0.019 *
	Present	7	6 (5.7)	1 (1.4)	0	0		
Cyst (well defined or ill-defined radiolucent lesion)	Absent	328	105 (100)	73 (100)	75 (100)	75 (100)		
	Present	0	0	0	0	0		
Structural dental anomalies (dilaceration,fusion,taurod ontism)	Absent	323	104 (99)	72 (98.6)	74 (98.7)	73 (97.3)	0.911	0.823 *
	Present	5	1 (1)	1 (1.4)	1 (1.3)	2 (2.7)		
Sinus opacification	Absent	328	105 (100)	73 (100)	75 (100)	75 (100)		
	Present	0	0	0	0	0		
Condyle joint space narrowing	Absent	327	104 (99)	73 (100)	75 (100)	75 (100)	2.13	0.546 *
	Present	1	1 (1)	0	0	0		
TMJ ankylosis	Absent	328	105 (100)	73 (100)	75 (100)	75 (100)		
	Present	0	0	0	0	0		
Fracture of jaw (maxilla and mandible)	Absent	328	105 (100)	73 (100)	75 (100)	75 (100)		
	Present	0	0	0	0	0		
Pulpal and periapical lesions	Absent	286	83 (79)	67 (91.8)	64 (85.3)	72 (96)	13.058	0.005 *
	Present	42	22 (21)	6 (8.2)	11 (14.7)	3 (4)		
Other anomalies	Absent	322	105 (100)	72 (98.6)	73 (97.3)	72 (96)	4.303	0.231 *
	Present	6	0	1 (1.4)	2 (2.7)	3 (4)		

[Table/Fig-1]: Age-wise association of incidental orthopantomographic findings.
Chi-square test was applied for statistical analysis. p<0.05 was considered statistically significant. TMJ: Temporomandibular joint; N: Number of participants; %: Percentage. An asterisk (*) has been added alongside the corresponding p-values obtained by Fisher's Exact test

OPG findings	Categories	N	Gender		χ^2	p-value
			Female n (%)	Male n (%)		
Age range (in years)	≤10	105	60 (34.9)	45 (28.8)	8.249	0.041
	11-12 years	73	36 (20.9)	37 (23.7)		
	13-14 years	75	30 (17.4)	45 (28.8)		
	≥15 years	75	46 (26.7)	29 (18.6)		
Impacted teeth (permanent teeth)	Absent	310	161 (93.6)	149 (95.5)	0.574	0.449
	Present	18	11 (6.4)	7 (4.5)		
Supernumerary (extra tooth)	Absent	320	169 (98.3)	151 (96.8)	0.734	0.392 *
	Present	8	3 (1.7)	5 (3.2)		
Hypodontia (missing teeth)	Absent	306	165 (95.9)	141 (90.4)	4.021	0.045
	Present	22	7 (4.1)	15 (9.6)		
Crowding (malocclusion)	Absent	326	172 (100)	154 (98.7)	2.219	0.136 *
	Present	2	0	2 (1.3)		
Fracture of tooth	Absent	317	167 (97.1)	150 (96.2)	0.223	0.637 *
	Present	11	5 (2.9)	6 (3.8)		
Delayed eruption of teeth	Absent	321	167 (97.1)	154 (98.7)	1.034	0.309 *
	Present	7	5 (2.9)	2 (1.3)		
Cyst (well defined or ill-defined radiolucent lesion)	Absent	328	172 (100)	156 (100)		
	Present	0	0	0		

Structural dental anomalies (dilaceration,fusion,taurodontism)	Absent	323	168 (97.7)	155 (99.4)	1.546	0.214 *
	Present	5	4 (2.3)	1 (0.6)		
Sinus opacification	Absent	328	172 (100)	156 (100)		
	Present	0	0	0		
Condyle joint space narrowing	Absent	327	171 (99.4)	156 (100)	0.91	0.34 *
	Present	1	1 (0.6)	0		
TMJ ankylosis	Absent	328	172 (100)	156 (100)		
	Present	0	0	0		
Fracture of jaw (maxilla and mandible)	Absent	328	172 (100)	156 (100)		
	Present	0	0	0		
Pulpal and periapical lesions	Absent	286	149 (86.6)	137 (87.8)	0.104	0.747
	Present	42	23 (13.4)	19 (12.2)		
Other anomalies	Absent	322	170 (98.8)	152 (97.4)	0.895	0.344 *
	Present	6	2 (1.2)	4 (2.6)		

[Table/Fig-2]: Gender-wise association of incidental orthopantomographic findings.
Chi-square test was applied for statistical analysis. p<0.05 was considered statistically significant. TMJ: Temporomandibular joint; N: Number of participants; %: Percentage. An asterisk (*) has been added alongside the corresponding p-values obtained by Fisher's Exact test



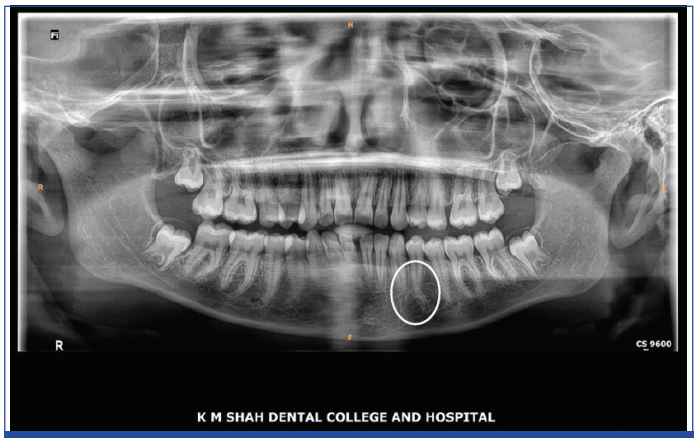
[Table/Fig-3]: Hypodontia.



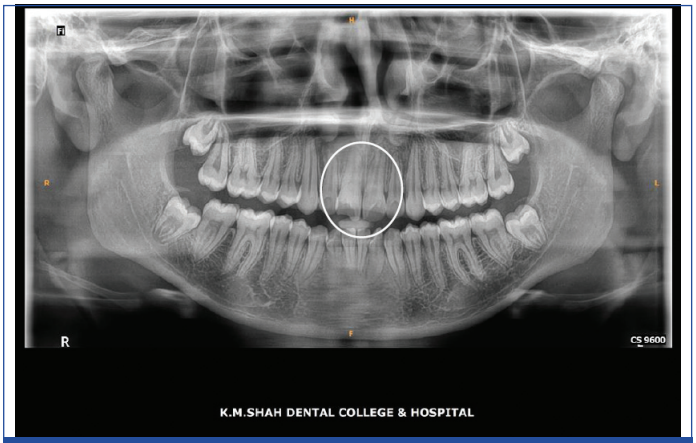
[Table/Fig-6]: Supernumerary teeth (Mesiodens).



[Table/Fig-4]: Impaction with 13.



[Table/Fig-7]: Dilaceration of teeth with 34.



[Table/Fig-5]: Fracture of teeth (Ellis class 1 fracture).



[Table/Fig-8]: Condensing osteitis in 35 region.



[Table/Fig-9]: Odontome in 24,25 region.

lesions, sinus opacification, temporomandibular joint ankylosis, or jaw fractures were identified in the present study.

The prevalence of impacted permanent teeth increased with advancing age, with the highest frequency observed among participants aged ≥15 years 8/75 (10.7%). Delayed eruption was more commonly observed in younger children aged ≤10 years 6/105 (5.7%). Pulp or periapical pathologies were predominantly observed in the ≤10 years age group 22/105 (21.0%) and least frequently observed in participants aged ≥15 years (3/75; 4.0%).

Quadrant-wise assessment was performed during radiographic evaluation to identify the location of incidental findings; however, data were aggregated and analysed on a per-patient basis for statistical interpretation.

DISCUSSION

The present study highlights the importance of panoramic radiography in detecting incidental findings in paediatric patients. The prevalence of impacted permanent teeth in the present study was 5.5%, which was lower than the prevalence reported in previous studies ranging from 13.2% to 27.7% [18,19]. This difference may be attributed to variations in age distribution, ethnicity, referral patterns, study design, and inclusion criteria. Hypodontia was detected in 6.7% of cases, which is more than the results of a study shown by Mittal V et al., i.e 3.01% among the North Indian orthodontic population [20].

Hypodontia was observed in 6.7% of participants in the present study, which was lower than the prevalence of 15.3% reported by Sridhar M, and Mathew MG among paediatric patients evaluated using panoramic radiographs [15]. The higher prevalence of pulp pathologies in higher age categories within the study population may be attributed to increased caries exposure and delayed dental intervention as age advances.

In the present study, supernumerary teeth were observed in 8/328 (2.4%) participants, which was comparable to the prevalence reported by Demiriz L et al., [21], who reported a prevalence of 2.14% in a Turkish population. Similarly, Finkelstein T et. al., reported a prevalence of 1.2% among Israeli orthodontic patients [22]. The slightly higher prevalence observed in the present study may be attributed to differences in ethnicity, geographic location, sample characteristics, and age distribution of the studied populations.

The present study also demonstrated a higher prevalence of supernumerary teeth among males, which is in agreement with previous studies by Finkelstein T et. al., [22] and other epidemiological investigations that reported male predominance in supernumerary tooth occurrence. However, Demiriz L et. al., [21] reported greater female predilection in an adult Turkish population, suggesting that demographic and population-based variations may influence prevalence patterns.

In a study from India, Mahaboob MN et al., [23] in a south Indian study, showed a prevalence of 1.2%. This variability is probably because of the different age groups which were examined. Not many prospective studies have been done in this regard in Gujarat, and the high incidental prevalence of this anomaly in the Gujarat population indicates that this anomaly is not that rare as was previously presumed.

Structural dental anomalies such as dilaceration, fusion, and taurodontism were observed in 5/328 (1.5%) participants in the present study. Similar developmental anomalies affecting tooth structure and morphology have been reported in previous epidemiological studies among paediatric populations. Batra M et. al., [24] reported developmental dental anomalies including fusion, hypodontia, microdontia, enamel hypoplasia, and supernumerary teeth among Indian school children, with an overall anomaly prevalence of 2.56%. Delayed eruption was observed in 2.1% of participants in the present study. Recognition of this finding is clinically important for timely diagnosis and appropriate treatment planning in paediatric patients.

Furthermore, statistically significant associations were observed between hypodontia and gender, as well as between impacted teeth, delayed eruption, and pulpal/periapical pathologies and age groups. Therefore, the null hypothesis stating that there would be no significant association between incidental OPG findings and demographic variables was rejected, and the alternative hypothesis was accepted.

The present study has important clinical implications in paediatric dental practice, as many incidental findings detected on OPGs remain asymptomatic during childhood but may affect eruption pattern, occlusion, esthetics, and long-term oral health. Pulp or periapical pathologies were the most common findings in the present study, 42/328 (12.8%), highlighting the importance of early radiographic detection to prevent progression of infection and associated complications. Similarly, hypodontia 22/328 (6.7%) may contribute to spacing, malocclusion, and esthetic concerns requiring interdisciplinary management. The significant association of impacted teeth and delayed eruption with age emphasises the value of routine panoramic evaluation during mixed dentition for timely interceptive treatment planning.

No cases of cystic lesions, sinus opacification, TMJ ankylosis, or jaw fractures were observed in the present study. This may reflect the relatively healthy Paediatric population, exclusion of symptomatic cases, Institution-based sampling, and inherent limitations of panoramic radiography such as distortion and superimposition, which may reduce detection of subtle lesions. Therefore, 0% prevalence should not be interpreted as true absence of these conditions. Future multicentric studies with larger samples and advanced imaging modalities are recommended for better evaluation of incidental findings in paediatric populations.

Limitation(s)

The present study was conducted using archived panoramic radiographs obtained from a single Institution in Vadodara, Gujarat, which may limit the generalisability of the findings to wider paediatric populations. The retrospective design restricted clinical correlation and long-term follow-up of the identified anomalies. The sample size was calculated primarily for prevalence estimation and not specifically powered for subgroup analyses evaluating associations with age and gender. Therefore, statistically significant and non significant associations should be interpreted with caution. Panoramic radiography also has inherent limitations such as magnification, distortion, and superimposition of anatomical structures, which may have affected the detection accuracy of certain findings. Furthermore, potential confounding factors such as socioeconomic status, oral hygiene practices, dietary habits, and previous dental

history were not evaluated and could have influenced the prevalence of incidental findings.

CONCLUSION(S)

Orthopantomographs frequently reveal clinically significant incidental findings in paediatric patients, with pulp or periapical pathologies and hypodontia being the most common abnormalities identified in the present study. Significant associations were observed between hypodontia and gender, as well as between impacted teeth, delayed eruption, pulp or periapical pathologies, and age groups. Careful and systematic evaluation of panoramic radiographs can facilitate early diagnosis, timely intervention, and comprehensive treatment planning in paediatric dental practice.

Acknowledgement

The authors gratefully acknowledge the Department of Paediatric and Preventive Dentistry, K. M. Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, for providing the necessary facilities and support required to complete the present study.

Authors' contribution: PSK: Conception and design of the study, supervision of the research work, critical revision of the manuscript for important intellectual content, and final approval of the version to be published; SBC: Data acquisition, radiographic evaluation, data analysis and interpretation, drafting of the manuscript, and literature review. Both authors agree to be accountable for all aspects of the work.

REFERENCES

[1] Goyal G, Padda S, Kaur B. Unusual incidental findings on intra- and extra-oral radiographs in North Indian population: A radiographic study. J Dent Allied Sci. 2016;5(2):74-78.
[2] White SC, Pharoah MJ, editors. Oral Radiology: Principles and Interpretation. 7th ed. St Louis: Elsevier Mosby; 2013. p.257-269.
[3] Hennig CL, Schüler IM, Scherbaum R, Buschek R, Scheithauer M, Jacobs C, Mentzel HJ. Frequency of dental x-ray diagnostics in children and adolescents: What is the radiation exposure?. Diagnostics. 2023;13(3):394.
[4] Sklavos A, Beteramia D, Delpachitra SN, Kumar R. The panoramic dental radiograph for emergency physicians. Emerg Med J. 2019;36(9):565-71.
[5] Mojumder D, Banik R, Islam MS, Asaduzzaman M. Using panoramic radiograph for identification of mandibular structures: A study on Bangladeshi population. KYAMC J. 2020;11(3):133-36.
[6] Hernández G, Plaza SP, Cifuentes D, Villalobos LM, Ruiz LM. Incidental findings in pre-orthodontic treatment radiographs. Int Dent J. 2018;68(5):320-26.
[7] Patil S, Doni B, Kaswan S, Rahman F. Prevalence of dental anomalies in Indian population. J Clin Exp Dent. 2013;5(4):e183-e186.
[8] Uslu O, Akcam MO, Evirgen S, Cebeci I. Prevalence of dental anomalies in various malocclusions. Am J Orthod Dentofacial Orthop. 2009;135(3):328-35.
[9] Uthman AT, Al-Saffar AB. Prevalence in digital panoramic radiographs of carotid area calcification among Iraqi individuals with stroke-related disease. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2008;105(4):e68-73.
[10] Ribeiro A, Keat R, Khalid S, Ariyaratnam S, Makwana M, do Prando M, Albuquerque R, Monteiro L. Prevalence of calcifications in soft tissues visible on a dental pantomogram: A retrospective analysis. J Stomatol Oral Maxillofac Surg. 2018;119(5):369-74.
[11] Chithralekha B, Narayan V. Incidental findings in OPG of orthodontic patients attending a private dental institute. J Evid Based Med Healthc. 2022;9(5):01-08.
[12] Gopi I, Maragathavalli G, Rajendran D. Analysis of panoramic images of orthodontic patients. Int J Res Pharm Sci. 2020;11(SPL3):1750-54.
[13] Preethy M, Elangovan S, Lakshmi SJ, Kumar S. Incidental findings of soft tissue radiopacities on digital panoramic radiographs: A cross-sectional study. J Indian Acad Oral Med Radiol. 2022;34(2):193-97.
[14] Gandhi JM, Govindaraju L. Evaluation of requirement of taking panoramic radiographs in children less than 6 years of age: A retrospective study. J Family Med Prim Care. 2022;11(5):2146-49.
[15] Sridhar M, Mathew MG. Panoramic radiographs and its importance in Paediatric dentistry - A retrospective study. Int J Clin Dent. 2022;15(4):669-76.
[16] Ragu R, Jaiswal M, Rathore M, Goyal A, Kumar A, Kapur A. Frequency and characteristics of gnathic dense bone islands in a paediatric population residing in Chandigarh, India: A cross-sectional radiographic study. Eur Arch Paediatr Dent. 2025;26(1):57-62.
[17] Talwade P, Deshpande PS, Pene S, Kumar S, Kudagi V, Limaye M. Incidental paranasal sinus findings on computed tomography images of Paediatric patients: A cross-sectional prevalence study. Int J Clin Pediatr Dent. 2023;16(2):292-94.
[18] Alamri A, Alshahrani N, Al-Madani A, Shahin S, Nazir M. Prevalence of impacted teeth in Saudi patients attending dental clinics in the Eastern province of Saudi Arabia: A radiographic retrospective study. The Scientific World Journal. 2020;2020(1):8104904.
[19] Marghalani AA, Alsaggaf AU, Hazzazi A, Dahlawi A, Badaoud MB, Alhazmi F, et al. Radiographic characteristics of impacted teeth: A retrospective study of 2199 radiograph. PLoS One. 2025;20(2):e0316749.
[20] Mittal V, Sehgal V, Arora P, Tikoo P, Vig S. Prevalence of hypodontia in North Indian orthodontic subjects and its association with other dental anomalies. J Datta Meghe Inst Med Sci Univ. 2024;19(1):24-29.
[21] Demiriz L, Durmuşlar MC, Mısır AF. Prevalence and characteristics of supernumerary teeth: A survey on 7348 people. J Int Soc Prev Community Dent 2015;5(Suppl 1):S39-43.
[22] Finkelstein T, Shapira Y, Pavlidi AM, Schonberger S, Blumer S, Sarne O, et al. Prevalence and characteristics of supernumerary teeth in Israeli orthodontic patients. J Clin Pediatr Dent. 2019;43(4):244-51.
[23] Mahabob MN, Anbuselvan GJ, Kumar BS, Raja S, Kothari S. Prevalence rate of supernumerary teeth among non-syndromic South Indian population: An analysis. J Pharm Bioallied Sci. 2012;4(Suppl 2):S373-75.
[24] Batra M, Gupta A, Singh S, Tomar RK, Prasad S, Yatharth Y. Prevalence of developmental anomalies in teeth among Indian school children: An epidemiological study. Bioinformation. 2025;21(5):1135.

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0000-0002-5367-3685.**
2. Resident, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0009-0007-3903-3861.**
3. Professor, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0000-0001-9301-2948.**
4. Professor, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0000-0003-4110-7990.**
5. Professor, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0000-0003-3467-2123.**
6. Professor, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0000-0001-8240-3142.**
7. Resident, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India. **ORCID ID: 0009-0002-8171-0372.**

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Sushil Bhagwan Chavan,
Resident, Department of Paediatric and Preventive Dentistry, K M Shah Dental College and Hospital, Sumandeep Vidyapeeth Deemed to be University, Vadodara-391760, Gujarat, India.
E-mail: sushilchavan177@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Mar 12, 2026
- Manual Googling: Jul 06, 2026
- iThenticate Software: Jul 08, 2026 (9%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Feb 20, 2026**
Date of Peer Review: **May 05, 2026**
Date of Acceptance: **Jul 10, 2026**
Date of Publishing: **Dec 01, 2026**