



Prevalence of Dental Anomalies in Odisha Population: A Panoramic Radiographic Study

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ABSTRACT

Aim: The aim of this study was to evaluate the prevalence of dental anomalies (DAs) in Odisha population using panoramic radiographs.

Materials and methods: In this study, 1,080 panoramic radiographs were evaluated for DAs. Dental records were reviewed for diagnostic confirmation. Anomalies related to the shape, size, position of teeth, and number of roots (supernumerary roots) were evaluated.

Results: The study results showed the prevalence of DAs to be 35.27%. The most prevalent was dilaceration, which was seen in 46.71% cases followed by peg laterals in 20.99%.

Conclusion: Dental anomalies were present in more than one-third of the study group, which was mostly related to shape of the teeth. Early diagnosis of these DAs helps in avoiding complications.

Clinical significance: Identification of DAs requires proper examination and thereby subsequent correct diagnosis. These anomalies can pose complications in normal functioning of orofacial complex. The knowledge of the prevalence of such anomalies aids dental practitioners for a proper treatment plan.

Keywords: Dental anomalies, Dilaceration, Microdontia, Panoramic radiographs, Transposition.

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INTRODUCTION

The development of tooth is a complex process, in which more than 300 genes have been known to be expressed.¹ Disturbances occurring during this process can result in dental anomalies (DAs) of tooth which can change the shape, size, structure, number, and their eruption patterns.² These alterations may be primary or arise secondary to environmental influences, certain genetic alterations, prenatal, and postnatal events like mineralization or maturation of the three mineralized components of the tooth, i.e., enamel, dentin, and the cementum.³⁻⁵

Dental anomalies usually cause malocclusion and affect the organization of the dental arches which in turn cause difficulties in dental treatment ranging from a simple extraction to root canal procedure.⁶ Therefore, knowledge on identification and prevalence of DAs helps the dental practitioners improve the treatment plan. Permanent dentition anomalies, when compared to the deciduous counterpart, are known to cause both short- and long-term complications which can lead to irreversible damages.⁷ These anomalies may involve or arise in a single tooth or may be a part of systemic disorder or a syndrome that arise generalized to involve all the teeth.⁸

Review of the literature has shown varying data on the prevalence of these DAs. The discrepancies in the data may be attributed to racial differences, different sampling techniques, and different diagnostic criteria.^{2,9-11} Knowledge on prevalence and incidence of DAs can also provide information for genetic and phylogenetic studies,

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which can further help the researchers in understanding the difference in different study populations. The aim of this study was to determine the prevalence of DAs in permanent dentition of Odisha population using orthopantomographs (OPG).

MATERIALS AND METHODS

The retrospective study consisted of 1,080 OPGs of individuals (540 males and 540 females) with known age and gender taken during the period of February 2014 to February 2016. The age ranged between 18 and 62 years. The OPGs for the study were obtained from the archives of the Department of Oral Medicine and Radiology, Kalinga Institute of Dental Sciences. Ethical Committee approval was obtained. The OPGs were taken with Myray Hyperion XQ Digital Machine (Italy), by the magnification factor of 1:1.

The OPGs showing any pathology, trauma, fracture which affected the normal growth of permanent dentition, poor quality panoramic radiographs, syndromic patients and OPGs of patients not native of Odisha were excluded from the study population. Good quality OPGs were included in the study.

Computerized screening (HP, Windows 7 professional, SP1 2.6GH2) of the OPGs was done to determine the DAs. The screening was done by a single radiologist with a limit of 20 radiographs a day. The DAs detected were root dilaceration, peg-shaped lateral incisors, talon cusp, concrescence, microdontia, supernumerary roots, transposition, and congenitally missing teeth.

RESULTS

The study comprised 540 males and 540 females with an age range of 18 to 62 years. Of the 1,080 cases evaluated, 381 cases (35.27%) had at least one DA. Dilaceration of the roots was the most prevalent DA (16.48%) encountered followed by peg-shaped lateral incisors (7.41%) and congenitally missing teeth (4.07%). Table 1 shows

Table 1: Distribution of patients and prevalence of different dental anomalies according to gender

Types of dental anomaly	Males (n = 540)	Females (n = 540)	Total n = 1080 (% prevalence)
Root dilaceration	85	93	178 (16.48)
Taurodontism	2	1	3 (0.28)
Peg-shaped lateral incisors	41	39	80 (7.41)
Talon cusp	3	1	4 (0.37)
Concrescence	1	0	1 (0.09)
Microdontia	16	9	25 (2.31)
Transposition	22	15	37 (3.43)
Congenitally missing teeth	24	20	44 (4.07)
Total	198	183	381 (35.27)

Table 2: Frequency of dental anomalies in the study population

Variables	Males	Females	Total n = 1080 (%)
Patients with one anomaly	161	162	323 (29.90)
Two anomalies	26	13	39 (3.61)
>Two anomalies	11	8	19 (1.76)
Total	198	183	381 (35.27)

the prevalence of different DAs according to gender. Root dilacerations and supernumerary roots were more prevalent in females, while the other anomalies were predominantly severe in males.

Table 2 shows the frequency of DAs among the study population, 323 (29.9%) patients had one DA followed by 39 (3.61%) patients with two anomalies and 19 (1.76%) with greater than two anomalies.

DISCUSSION

Dental anomalies of tooth can vary from a mild developmental delay to the most severe tooth agenesis.¹¹ The etiology of these has been suggested to be genetic and hereditary, as derived from studies in families, monozygotic twins, and from the frequent observation of associations of certain DAs.¹² Dental anomalies should be diagnosed at the earliest as they might complicate the treatment plan as in the case of any orthodontic or endodontic procedures.

Baccetti¹³ found that 34% of the patients with conical-shaped upper lateral incisors had palatally displaced canine, and dilacerations of root can cause difficulty in root canal therapy and extractions. Root canal filling becomes challenging in taurodontism because of the complexity of the root canal anatomy and the proximity of the buccal orifices.¹⁴

Many studies were conducted in the past to find out the prevalence of each of these DAs worldwide, and each study showed few variations in the data which may be due to ethnic and sampling differences. Our study was conducted to determine the prevalence of DAs using the panoramic radiographs of patients with known age and sex in Odisha population. Table 3 shows the comparison of DAs encountered in the present and previous studies.

The prevalence of DAs in our study was about 35.27%, which was almost near to the study conducted by Patil et al¹⁵ in Jodhpur which was 36.7%. Similar studies done by Afify and Zawawi⁸ and Goncalves-Filho et al⁹ showed a prevalence of 45.1 and 56.9%, which was higher in comparison to our study.

The most prevalent DA in our study was root dilaceration which was present in 46.71% of cases. The prevalence of root dilaceration was 14.01% in a study conducted by Goncalves-Filho et al⁹ and 22.5% by Guttal et al.⁷ Root dilaceration refers to angulation or a sharp bend or curve in the root which is thought to occur due to trauma

Table 3: Comparison of dental anomalies encountered in the present and previous studies

Dental anomaly	Present study (Prevalence %)	Previous studies (Prevalence %)
Root dilaceration	16.48	14.01 – Goncalves-Filho et al 22.5 – Guttal et al
Peg-shaped lateral incisors	7.41	0.8–8.4 – Chanchala
Congenitally missing teeth	4.07	11.3 – Dhanrajani
Transposition	3.43	0.09–1.4 – Papadopoulos et al
Microdontia	2.31	0.8–9.14 – Guttal et al
Talon's cusp	0.37	1–8 – Shrestha et al
Taurodontism	0.28	27.19 – Goncalves-Filho et al 8 – Darwazeh et al
Concrescence	0.09	0.63 – Goncalves-Filho et al

(Figs 1A to C). Root dilaceration is thought to be a limitation in orthodontic treatment,⁵ and they present difficulties at the time of extraction.¹⁶

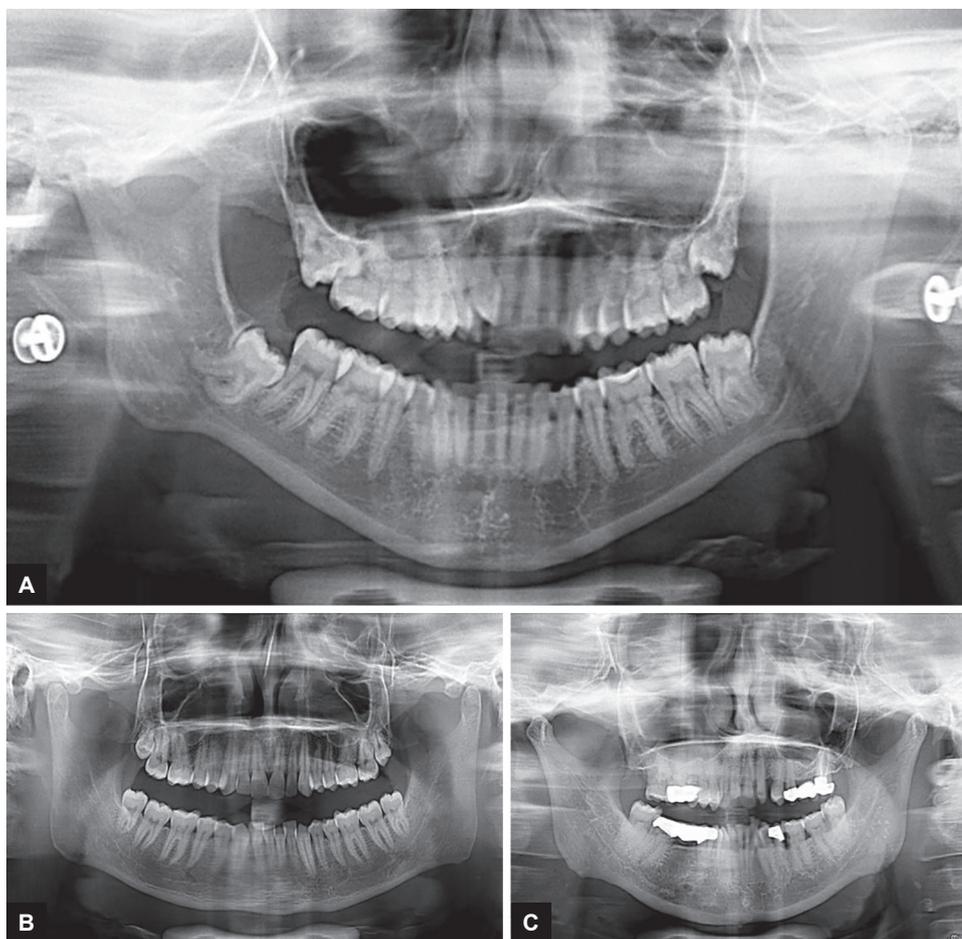
Peg-shaped laterals refer to a conical-shaped lateral incisor with a sharp and acute edge, which is broadest

cervically and tapers incisally to a blunt point, and the prevalence varies from 0.8 to 8.4% whereas in our study the prevalence was 7.41%, which was the second common anomaly.^{2,17}

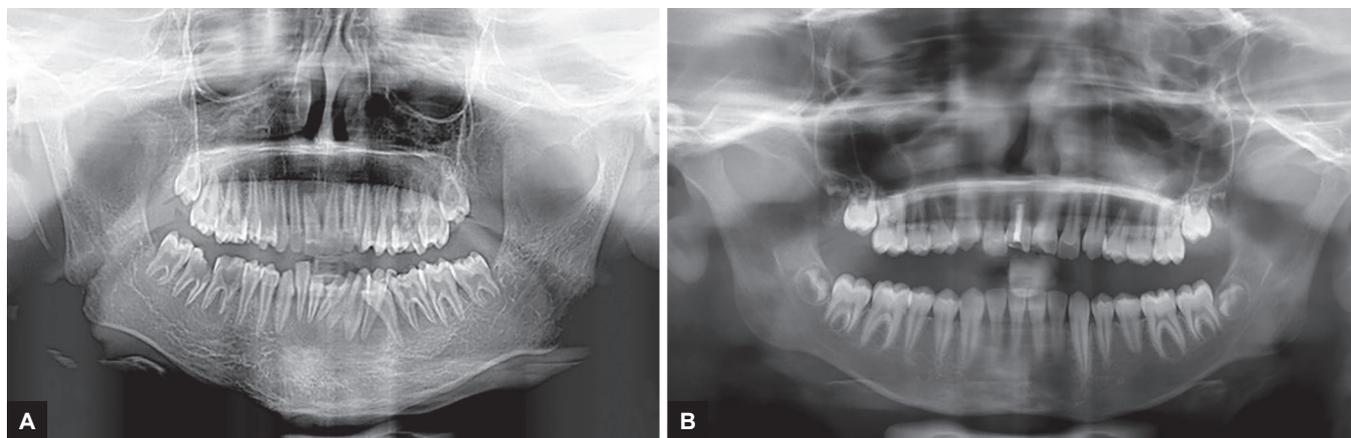
Failure of teeth to form is noted to be one of the most common DA encountered with a prevalence of 1.6 to 11.3%. Our study showed a prevalence of 4.07% congenitally missing teeth, which is in consistent with the previous studies.^{3,18}

Tooth transposition is a rare DA where there is a positional interchange of two neighboring teeth, or the development or eruption of a tooth in a position normally occupied by a nonneighboring tooth. Hence, tooth transposition can be considered as a peculiar type of ectopic eruption in which each ectopic tooth changes the normal order of the tooth sequence in the dental arch, and the prevalence is 0.09 to 1.4%.¹⁹ Our study showed a high prevalence of 9.71%.

The term microdontia should be applied only when the teeth are smaller than usual (Figs 1A to C). In our study, the prevalence of microdontia is 2.31% and it was in the range of 0.8 to 9.14% according to Neville et al³ and Guttal et al.⁷ Macrodontia means relatively larger tooth than the normal. Its occurrence is very low; >1% of population.⁹ In our study, there were no cases with this anomaly.



Figs 1A to C: Orthopantomogram showing: (A) Dilaceration of mesial and distal roots of 48; and (B) Microdontia involving maxillary molars; and (C) Concrescence of 47 and 48



Figs 2A and B: Orthopantomogram showing: (A) Taurodontism involving all the maxillary and mandibular molars; and (B) Talon's cusp in relation to maxillary right and left central incisor

Supernumerary roots refer to the development of increased number of roots compared to the normally described, which usually causes difficulty in endodontic procedures.³ Our study showed a prevalence of 0.83%. Taurodontism is a variation that occurs in the tooth form where the tooth shows elongated crown or apically displaced furcation, which results in the pulp chamber that has increased length of the tooth (Figs 2A and B). This DA can be seen as an isolated incident, in families and associated with syndromes.²⁰ Our study showed a prevalence of 0.28%, which was very less when compared with other studies done by Goncalves-Filho et al⁹ and Darwazeh et al,²¹ who reported 27.19 and 8% respectively.

Talon's cusp resembles an Eagle's talon, which is an alteration of the tooth shape, i.e., characterized by the presence of an accessory cusp on the lingual or buccal face of an anterior tooth that projects from the cingulum (Figs 2A and B).¹⁶ Talon's cusp may fracture or be abraded as soon as the tooth comes into occlusion, exposing the pulp which cause endodontic complications. The prevalence ranges between 1 and 8%.² Our results showed an occurrence of 0.37% which falls within this range. Concrescence is the cemental union of two adjacent teeth without confluence of the underlying dentin showing independent pulp chambers as well as root canals which usually affect the extraction of adjacent teeth (Figs 1A to C).² In our study, the prevalence rate was 0.09%, which was nearer to the findings of Goncalves-Filho et al⁹ where they observed the prevalence to be 0.63%.

CONCLUSION

Our study showed that there was an overall prevalence of 35.27% DAs in the population studied where the anomaly related to shape was more when compared with those occurring in tooth size, position, and root number. These DAs are related to dental problems which should be known to dentists as they have greater clinical

impact. Hence, their prevalence in different populations, early diagnosis, and treatment helps to avoid further complications.

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