

Prevalence of Dental Anomalies through Panoramic Radiographies of Children from Argentina

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Abstract

Dental anomalies are changes in teeth structures that can be of number, shape, size and position and can affect only one tooth or can be associated to various syndromes. The purpose of the present study was to evaluate, through panoramic radiographies, the prevalence of all type of dental anomalies and the corresponding subtypes in a dental patient child population of Tucuman, northern Argentina.

This cross sectional study was performed on 223 patients attending to the School-Hospital of our institution. Dental anomalies were examined according to the following types and subtypes: (a) number (including hypodontia or tooth agenesis, and supernumerary tooth); (b) shape (including microdontia and macrodontia, fusion-germination, taurodontism, talon cusp, and dens invagination (dens in dente); (c) structure (including imperfect amelogenesis, imperfect dentinogenesis); and (d) position (including transposition, displacement which mean rotation or angulations, and impaction).

The prevalence of dental anomalies was 43%, which was 20.1% in females and 22.9% in males, with no statically significant differences ($p > 0.05$) between them. Position (25.56%) and number (13.45%) anomalies were the most common types in both sexes.

Impaction (13.45%), rotation (11.65%) supernumerary tooth (8.97%) and tooth agenesis (4.48%) were the most common subtypes of dental anomalies.

The tooth mostly affected by the position anomalies was the maxillary canine (9.4%), followed by the second maxillary premolar (5.38%). The second mandibular premolar (2.25%) was the most affected by agenesis, while the highest prevalence was mesiodens (4.9%) in the supernumerary category.

Position dental anomalies were of the highest prevalence in the population sample of northern Argentina. The frequency and type varies among the different populations, confirming the racial role in the prevalence of these anomalies. Panoramic radiographies are very useful for diagnosing dental anomalies.

Keywords: Dental Anomalies; Panoramic Radiographies; Children; Argentina

Introduction

Dental anomalies are changes in the teeth structures which surge because of disturb during the dental formation and can be of genetic origin or acquired during the development. These anomalies can be of number, shape, structure and position [1]. Dental anomalies can affect only one tooth or can be associated to various syndromes [2,3]. Comparing to dental caries and periodontal diseases, dental anomalies are less common but their treatment and control could be more difficult and complex as the patient grows [4].

Prevalence of dental anomalies has been investigated in different communities and ethnic groups in several studies; however, variations in factors, such as race, sampling methods and different diagnostic criteria have led to inconsistent results between and within populations [5-9].

Prevalence is calculated as the number of anomalies divided into the number of the total population. In this way, prevalence of dental anomalies was 18.17% in a population from Iran and no significant differences were found in genders [8]. In this group prevalence of dilacerated teeth was 5.29%, taurodontism 5.38%, supernumerary tooth 0.51%, agenesis 1.11%, fusion 0.09%, germination 0.09%, impaction 3.41%, transposition 0.18%, dens invagination 1.37% [1]. In western Saudi Arabians prevalence of dental anomalies was reported to be 45.1%. The most common anomalies were congenitally missing teeth and impaction [10]. In Turkish children prevalence of dental anomalies was 39.2%, being position and shape those of more percentage of prevalence.

Purpose of the Study

The purpose of the present study was to evaluate, through panoramic radiographies, the prevalence of all type of dental anomalies (number, shape, structure and position) and their subtypes in a dental patient population of Tucuman, placed in northern Argentina.

Materials and Methods

This cross sectional study was based on the evaluation of dental anomalies on panoramic radiographies of outpatients attending the dental clinics at the Dentistry Faculty of National University of Tucuman, Argentina. Digital computed panoramic radiographies of 108 males and 115 females, mean aged 8.94 ± 1.8 were taken. This study was approved by the institutional Ethics Committee of the School Hospital.

Exclusion criteria included patients with syndromes that could cause dental anomalies such as Down's syndrome, cleidocranial dysostosis, cleft lip and palate. Third molars were also excluded as they commonly exhibit variation in their morphology and position. In order to reduce radiographic misinterpretation, blurred image teeth were also excluded.

All subjects were at the permanent dentition stage and had panoramic radiographies taken by the same technician using the same X-ray device and the same standardized method. Radiographs were taken using an Orthophos XG Sirona machine and images were processed with Sidexis next generation software. The panoramic images were standardized examined under good lighting conditions, screen brightness and resolution. All the radiographies were examined by an experienced clinician in order to eliminate inter examiner differences. Repeatability was tested on 30 randomly selected radiographies examined at least 3 weeks after the initial examination.

Dental anomalies were divided into the following types and subtypes: (a) number (including hypodontia or tooth agenesis, and supernumerary tooth); (b) shape (including microdontia and macrodontia, fusion-germination, taurodontism, talon cusp, and dens invagination (dens in dente); (c) structure (including imperfect amelogenesis, imperfect dentinogenesis); and (d) position (including transposition, displacement which mean rotation or angulations, and impaction).

Data were analysed using descriptive statistics, including frequency and per cent, and the statistical test X² (Chi Square) at 0.05 significant level.

Results

From the 223 examined panoramic radiographies, 43% showed dental anomalies, being the highest prevalence to position (25.56%), number (13.45%), shape (3.58%) and structure (0.44%) (Table 1).

Anomalies	Frequency (n)	Prevalence (%)
Number	30	13.45
Shape	8	3.58
Structure	1	0.44
Position	57	25.56
Total anomalies	96	43.00
No abnormalities	127	56.95
Total	223	100

Table 1: Frequency and prevalence of dental anomalies in panoramic radiographic images of children of both sexes from Tucumán-Argentina.

Around 77 children (34.53%) had one dental anomaly, while 19 of them (8.52%) had two anomalies (Table 2).

Number of anomalies	Frequency (n)	Prevalence (%)
One	77	34.53
Two or more	19	8.52
No anomalies	127	57
Total	223	100

Table 2: Prevalence of the number of dental anomalies in panoramic radiographic images of children of both sexes from Tucumán-Argentina.

The prevalence of dental anomalies according to sex was equally affected, 20.1% for girls and 22.9% for boys (Table 3).

Anomalies	Female (n = 115) n (%)	Male (n = 108) n (%)	Total (n = 223) n (%)
Number	12 (5.4)	18 (8.1)	30 (13.5)**
Shape	4 (1.8)	4 (1.8)	8 (3.6)**
Structure	0	1 (0.4)	1 (0.4)**
Position	29 (13.0)	28 (12.6)	57 (25.6)**
No anomalies	70 (31.4)	57 (25.6)	127 (57)**

Table 3: Absolute and relative distribution of dental anomalies in relation to sex in panoramic radiographic images of children from Tucumán-Argentina.

Chi cuadrado Test: *Significative ($p < 0.05$); **no significative ($p > 0.05$).

According to the subtype of anomaly, the highest prevalence corresponded to impaction (13.45%), followed by rotation, angulation (11.65%), supernumerary tooth (8.97%) and dental agenesis (4.48%) (Table 4).

Anomalies	Subtype	Frequency	Prevalence (n = 223) (%)
Number	Supernumerary	20	8.97
	Agenesis	10	4.48
	Total	30	13.45
Shape	Dens In Dent	0	0
	Talon Cusp	2	0.89
	Taurodontism	2	0.89
	Fusion	0	0
	Germination	0	0
	Microdontia	3	1.34
	Macrodontia	1	0.46
Total	8	3.58	
Structure	Imperfect Amelogenesis	1	0.44
	Imperfect Dentinogenesis	0	0
	Total	1	0.44
Position	Rotation Angulation	26	11.65
	Impaction	30	13.45
	Transposition	1	0.46
	Total	57	25.56

Table 4: Frequency and prevalence in relation to sub-type of dental anomalies in panoramic radiographic images of children of both sexes from Tucumán-Argentina.

The tooth most affected by the position anomaly was the maxillary canine (9.4%), followed by the second maxillary premolar (5.38%), the mandibular canine (3.59%) and the second mandibular premolar (2.69%) (Table 5).

Tooth	Position anomalies	
	n	(%)
Maxillary canine	21	9.4
Second maxillary premolar	12	5.38
Mandibular canine	8	3.59
Second mandibular premolar	6	2.69
Central maxillary incisor	4	1.79
Lateral maxillary incisor	4	1.79
Second mandibular molar	1	0.45
Lateral mandibular incisor	1	0.45
Total	57	25.60

Table 5: Proportional distribution (n = 223) according to the teeth affected by the position anomalies of children of both sexes from Tucumán-Argentina.

From dental agenesis, the tooth mostly affected was the second mandibular premolar (2.25%), followed by the lateral maxillary incisor (0.92%) and the second maxillary premolar (0.92%). Among the 20 cases with supernumerary tooth, 11 of them (4.9%) were mesiodens and 9 (4.1%) were heteromorphic tooth (Table 6).

Anomalies	Teeth	n	(%)
Supernumerary	Mesiodens	11	4.9
	Others	9	4.1
Agenesis	Second mandibular premolar	5	2.25
	Lateral maxillary incisor	2	0.92
	Second maxillary premolar	2	0.92
	Central mandibular incisor	1	0.45
Total		30	13.45

Table 6: Proportional distribution ($n = 223$) according to the affected teeth by the number anomalies of children of both sexes from Tucumán-Argentina.

Only two subjects were identified with taurodontic tooth (0.89%) and 2 (0.89%) with talon cusp had maxillary incisors. Microdontia was present in 1.34% and affects the lateral maxillary incisor. Anomalies of tooth structure were rare since we only found 1 case (0.44%) of imperfect amelogenesis (Table 6).

Discussion

Identification of dental anomalies in a specific population is important because it allows identifying in a precocious way the most common disorders of this population, and thus, favors an early diagnosis and proper management of the case. Studies related to the prevalence of dental abnormalities often shows discrepant results, which may be due to ethnic or sampling differences [5-9].

In our study, the most prevalent anomaly was that of position (25.56%) coinciding with the findings in a sample from a Turkish population (23.88%) [8], where the highest percentage corresponds to impaction (17.83%); ours (13.45%), was similar to that on an Iranian population [11]. Our work included no third molars, as did that of the Turkish [8] and Iranian [11] populations. Other works that excluded third molars reported prevalence of impacted tooth of 3.41% [1] and 16.6% in patients attending the Dental Faculty of Rasht, Iran [12].

The prevalence of rotation obtained in our work was 11.65%, which coincides with the findings on an Indian population (10.24%) [6], where second mandibular premolar were the most frequently rotated, followed by the first mandibular premolar and the central maxillary incisors. We found the following order of frequency: maxillary canine, second maxillary premolar and mandibular canine. In western Saudi Arabian children, the prevalence of rotation was 20%; the most commonly involved tooth was the first maxillary premolar [10].

Hypodontia is one of the most common dental anomaly, and the absence of one permanent tooth can cause serious damage to the bone development and function; which can also compromise facial aesthetics [13,14].

The prevalence of dental agenesis in different studies is between 1.11% [1] and 7.1% [7], while in our study it was 4.48%, and the most affected tooth was the second mandibular premolar, coinciding with the findings on a Roman children population [7]. Other workers published the lateral maxillary incisor as the most affected tooth; this was in children of the Iranian and Indian populations [1,6].

The prevalence of supernumerary tooth was published between 0.51% [1] and 5.86% in Brazilian children [5]; however it was of 8.97% in our work, where 4.9% were mesiodens.

Taurodontism was present in 0.89%, while a prevalence of 0.04% of taurodontic tooth was reported in Roman children [7]. These findings contrast with other studies that published a prevalence of 48%, 15% and 46.4% in a sample of a Chinese population [16]. Other authors reported prevalence of teeth with this anomaly between 5.6% and 8.61% [17-19]. The main cause of this inconsistency may be due to the difference in races or in the applied criteria to define taurodontism.

The case of a microdontic tooth found in our work involved lateral maxillary incisors with a prevalence of 1.34%, while the range in different other populations was between 0.8% and 8.4% [6].

Talon cusp or accessory cusp is an alteration of the tooth shape which is characterized by the presence of an accessory cusp on the lingual or buccal face of an anterior tooth. Studies reporting the prevalence of talon cusps are limited, but estimates suggested that its incidence is between 1% and 8% of the population [13]. Our results showed a prevalence of 0.89%, affecting the central maxillary incisors.

The structure anomalies are of rare occurrence, where the clinical alteration of imperfect amelogenesis includes aesthetic defects and dentine sensitivity [20]. Only one case was reported in our study (0.44%).

No significant differences in prevalence of the different anomalies according to sex were found in this study, while other researchers found a greater affection in women [1,7].

Conclusion

Dental anomalies are common and most of them are asymptomatic events; they show variability among different populations and can be detected through radiographies.

The highest prevalence of dental anomalies in a sample of a population of northern Argentina was those of position. Early diagnosis helps in the prevention and in the treatment of these anomalies, which compromise health and aesthetics of children and adolescents improving their quality of life.

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