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Distribution and Prevalence of Various Developmental Dental Anomalies in Iraqi population : A Radiographic Study.

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Abstract

Aim: To determine the prevalence of dental anomalies in Iraqi population, and investigate their possible association with gender and teeth.

Materials and methods: Panoramic radiographs of 800 patients out of 350 with dental anomalies (200 females and 150 males) ,an age range of 18–30 years (300 : 18-25 years ; 50: 25-30 years) were examined for anomalies in teeth number, shape, size and position.Descriptive statistics was performed using SPSS. The level of significance was set at 95% confidence level.

Results: Among the 800 radiographs examined, a total of 350 (43.8 %) had developmental dental anomalies which includes 150 (42.9%) males and 200 (57.1%) females. Around 290 (82.9%) had at least one anomaly, 50 (14.2%) cases with two anomalies and only 10 (2.9%) exhibited more than two anomalies. Both males and females were equally affected. Of these 350 anomalies, 300 (85.7%) occurred in the age group 18–25 years compared to 50 (14.3%) cases in 25–30 years range .

Conclusion: The high prevalence of Developmental Dental Anomalies suggests the need to increase the understandingof their etiology and aid for better management, intervention and prevention.

Keywords : Anomalies, radiographic, rotation, ectopic eruption.

Introduction

Developmental dental anomalies (DDA) are considered as an important category of morphological and structural dental variations[1] .Dental anomalies are one of the anomalies of the human structure that result from disturbances during formation of tooth[2] .Abnormalities in tooth size, shape, and structure result from disturbances during the morpho-differentiation stage of development, while ectopic eruption, rotation and impaction of teeth result from developmental disturbances in the eruption pattern of the permanent dentition [3] .These anomalies may be involving one tooth or generalized to involve all the teeth or they may be present as a part of any systemic disorders or syndromes[4]. Dental anomalies can increase the risk of caries and periodontitis, and can lead to endodontic, aesthetic or orthodontic problems [5] .Anomalies of tooth size (microdontia and macrodontia);shape (dens invaginatus, talon cusp, dens evaginatus, gemination,fusion, root dilacerations, taurodontism and

concrescence);number (hyperdontia, hypodontia and oligodontia);structure (amelogenesisimperfecta, dentinogenesis imperfect and dentin dysplasia) occur due to disturbances in the embryologicaldevelopment of teeth during the morphodifferentiation or histodifferentiation stages of development[6] .Positional anomalies such as rotation, ectopic eruption occur due to disturbances in the eruption pattern[6] . Various studies reported the distribution of various dental anomalies in different populations, but the results are conflicting. The discrepancies in their results were attributed to racial differences, variable sampling techniques, and different diagnostic criteria[7,8,9,10] . The present study was performed to evaluate the frequency of occurrence of dental anomalies of size,number, and shape in Iraqi population and investigate their possible association with gender and teeth .

Materials and methods

This study was based on the evaluationof 350 patients with DDA on panoramic radiographs of 800 patients. Digital computed panoramic radiographsof 150 males and 200 females of Iraqi subjects with an age rangeof 18–30 years (300 : 18-25 years ; 50 : 25-30 years) were considered for the study. Patients of this age group were selected to avoid misinterpretation caused by delayed eruption or uneruption of permanent teeth in young patients and also the regressive alterations or other dental diseasesin older individuals. The exclusion criteria include patients with syndromes that could cause DDA such as Down's syndrome, cleidocranial dysostosis, cleft lip and palate. Third molars were also excluded as they commonlyexhibit variation in their morphology and position. In orderto reduce radiographic misinterpretation, blurred image teeth were also excluded. All subjects were in the permanent dentition stage and had panoramic radiographs taken by using (My ray CE 0051(V.B1 cocc)A 14/C-IMOLA (BO)-Italy, X-ray source (85 kVp, 10 mA) , exposure time (18 sec)) .The selected radiographs were reviewed for the followingDDA: hypodontia, hyperdontia, ectopic eruption, impaction , rotation,microdontia, macrodontia, transposition, , fusion,dilaceration, supernumerary roots and anyother unusual dental conditions (figure.1) . Descriptive statistics was performedfor analyzing the data and group comparison .The levelof significance was set at 95% confidence interval.

Results

Among the 800 radiographs examined, a total of 350 (43.8 %)had DDA which includes 150 (42.9%) males and 200 (57.1%)females (Table 1,Figure 2). Around 290 (82.9%) had at least one anomaly,50 (14.2%) cases with two anomalies and only 10 (2.9%)exhibited more than two anomalies (Table 2, Figure 3). Both males and females were equally affected. Of these 350anomalies,300 (85.7%) occurred in the age group 18–25 years compared to 50 (14.3%) cases in 25–30 years range (Table 3,Figure 4). The most common anomaly was rotation 240 (30%) followed by impaction 70 (8.8%) ,ectopic eruption 60 (7.5%) and dilaceration23 (2.9%), (Table 4).Rotation ,impaction ,ectopic and dilacerations were the most prevalent anomalies and statistically significant. Moreover, it was predominant in 140 (17.5%)males compared to 100 (12.5%) females. Maxillary first premolars and canine (18.8%) were most often rotated followed by mandibular First premolar

(11.3%). Ectopic eruption of teeth was common in maxillary canine followed by mandibular first premolar. An interesting finding noted during the evaluation of radiographs was that many cases of rotation were associated with ectopic eruption of adjacent teeth. In hypodontia, maxillary lateral incisor (0.4%) was the most frequently missing tooth followed by mandibular premolars (0.3%) and maxillary premolars (0.13%). Among the 7 cases of hyperdontia, 3(0.4%) were supernumerary premolars, 2 (0.3%) supernumerary lower incisors and 2 (0.3%) mesiodens.Mandibular first premolar (1.6%) was commonly affected by dilacerations .Premolars (0.4%) had more supernumerary roots .The only 2 teeth affected by macrodontia .Transposition was present only in 5 (0.6%) patients where there was a change in the position of maxillary canine and first premolar. Root fusion was noted in 3 cases and it was predominant in lower second molar (Table 4,Figure 5). There was statistically significant difference between study age groups and gender of anomalies with p-value =0.041(Table 5) .

Discussion

Developmental dental anomalies are an important category of dental symptomatology. The knowledge of their prevalence and the degree of expression can provide valuable information for phylogenic and genetic studies and also help in the understanding of differences among population and between various population groups[11].

In the present study 57.2% had no dental anomaly, 43.8% showed presence of one anomaly . The findings regarding frequency of dental anomalies were higher than study conducted by Sogra et al in 2012[12] among Iranian orthodontic patients and Gupta et al among Indian population[13] .There is statistically significant difference between both the sexes in incongruence with other studies[4,13,14,15,16].

The female predominance in some studies is probably due to high frequency of their visit to the dentist, as they are more conscious about esthetics and general oral health care which is accordance with present study[1,17].

Rotation was the most frequent dental anomaly in the present study .Maxillary first premolars were commonly rotated with most of the cases showing ectopic eruption of adjacent maxillary canines which is consistent with the studied one by Vani et al.[18] .Kathariya et al. [19] concluded that the percentage of dental anomalies were high specially impaction and rotated teeth during a study was conducted a group of 600 children, of them 293 (48.8%) were males and 275 (45.8%) females which in partial agreement with result of this study .

The exclusion of this entity in most studies, is mainly because of the argument that rotation is not

Developmental[4,10,14,15,16,17,20,21,22,23] . But literature cites that the etiology of rotations multifactorial and based on pre-eruptive and post eruptive disturbances[21] . Several factors like trauma, ectopic eruption, extraction, hypodontia, periodontitis of adjacent teeth can lead to further change in the angulation of teeth posteruptively. Likewise, rotation was associated with other dental problems in this study supporting their multifactorial etiology.

There were 70 root dilacerations cases(7.2%) which is in conformity with result of Vani et al.[18] study , however it was significantly greater than those observed in other studies[4,10,15,17,22] .

.Patilet al. [24] found that there were 22 dilacerations cases in a retrospective study of 4133 panoramic radiographs of patients (1519 patients had at least one dental anomaly) and history of trauma was obtained in all cases, the result of this study have shown that variation in the prevalence of dilacerations with present study could be due to regional and racial differences. which is unlike the result of present study .

In the present study , maxillary canine was the most common ectopically erupted tooth supporting the findings of previous studies[10,13,14,15] .Vani et al.[18] ; the prevalence of ectopic eruption was rather high compared to studies on other population[4,14] .

In the present study, supernumerary teeth were seen among 1% subjects and these results are less than as observed in study done Gupta et al that showed prevalence 2.40% of participants with supernumerary teeth and other study also showed that 5.3% of teeth [19].

The present data showed most common missing tooth as lateral incisors followed by premolars and similar findings were obtained by Menczer[25] which also showed that lateral incisor is the most common missing teeth followed by premolars. But some other studies conducted by Clayton (1956)[26] and Castaldi et al. (1966)[27] showed that 2nd premolar was the most common missing teeth followed by lateral incisor. The study showed tooth size discrepancy such as macrodontiain only 2 teeth (0.3%). There was no data related to peg-shaped lateral incisors where as many studies have this finding varied between 0.3 and 8.4%.14-15[9,28].The prevalence of root fusion has been reported to be in 3cases(0.4%) and transposition was present only in 5 (0.6%) patients , the results were lower than Kositbowornchai et al in 2010 among Thai patients who found (0.7% root fusion ; 1.6% transposition and 1.4% macrodontia)[23] .

Conclusion

The high prevalence of Developmental Dental Anomalies suggests the need to increase the understanding of their etiology and also aid for better management , intervention and prevention.

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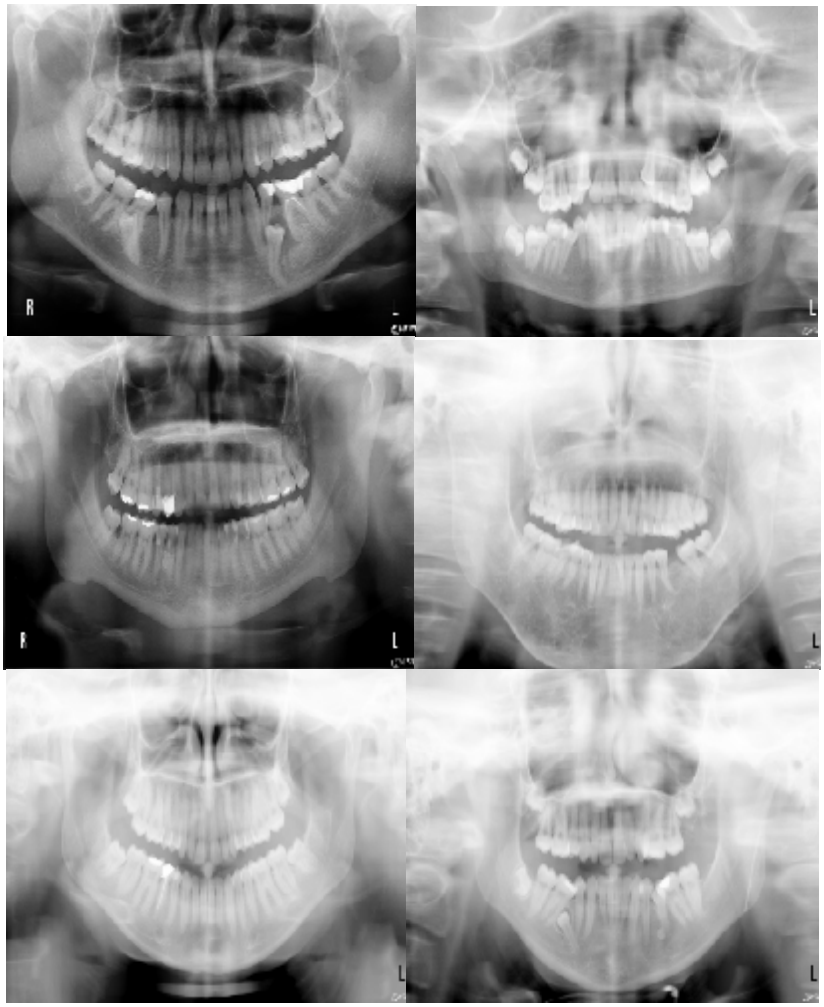

Figure 1. Developmental dental anomalies .

Table 1.Gender distribution of developmental dental anomalies .

Gender	No. of anomalies	%
Male	150	42.9
Female	200	57.1
Total	350(43.8%)	100

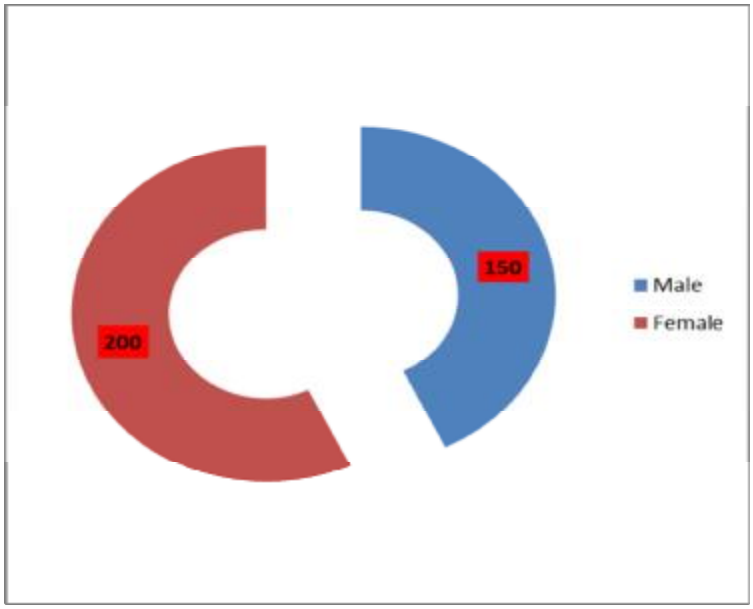

Figure 2. Gender distribution of developmental dental anomalies .

Table 2.Distribution of developmental dental anomalies .

No. of anomalies	No.	%
1(one anomalies)	290	82.9
2(two anomalies)	50	14.2
>2(more than two anomalies)	10	2.9
Total	350	100

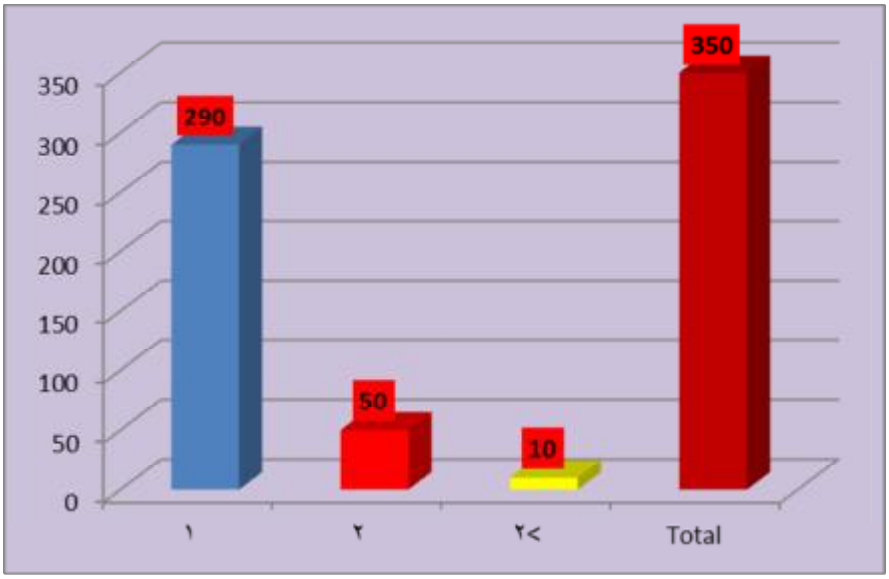

Figure 3. Distribution of developmental dental anomalies .

Table 3. Distribution of developmental dental anomalies in a study age groups .

Age	No. of anomalies	%
18-25	300	85.7
25-30	50	14.3
Total	350	100

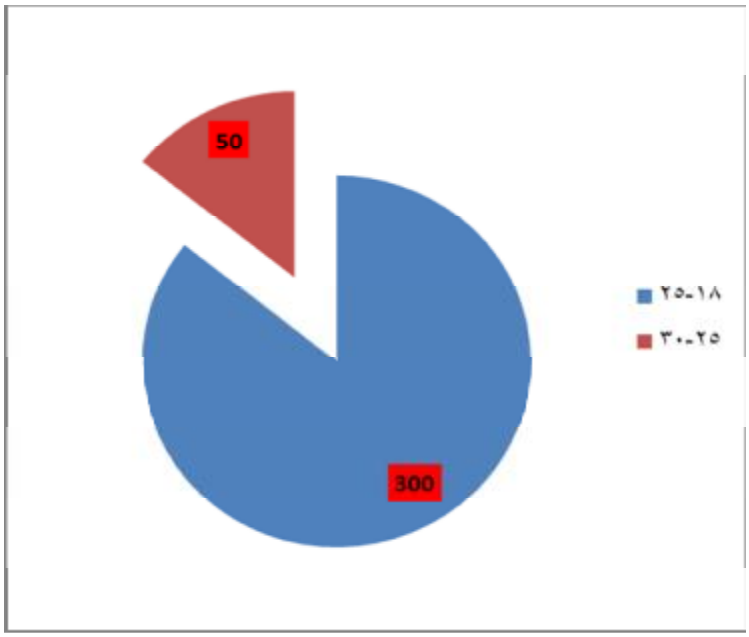

Figure 4. Distribution of developmental dental anomalies in a study age groups .

Table 4. The most common prevalence of developmental dental anomalies .

Type of anomalies	No. of anomalies
Rotation	240 (30%)
Impaction	70 (8.8%)
Ectopic eruption	60 (7.5%)
Dilaceration	23 (2.9%)

Table 4.Distribution , location and prevalence of developmental dental anomalies according to types

type of anomalies			Total		Statistic	
			No.	%	P-value	Sig
size	macrodontia	lower incisor	2	0.57	0.123	NS
Shape	roots fusion	Lower 7	2	0.57	0.089	NS
		Upper 7	1	0.29		
	dilaceration	Lower 4	13	3.71	0.047	S
		Upper 4	8	2.29		
		Upper 3	2	0.57		
	supernumerary roots	Lower 5	1	0.29	0.057	NS
		Lower4,5	2	0.57		
Number	hyperdontia	supernumerary premolar	3	0.86	0.043	S
		supernumerary lower incisor	2	0.57		
		mesiodens	2	0.57		
	hypodontia	Lower 4	2	0.57	0.076	NS
		Upper 4	1	0.29		
		Upper 2	3	0.86		
positional	rotation	Upper 4	60	17.1	0.028	S
		Lower 4	90	25.7		
		Upper 4,3	90	25.7		
	ectopic	+rotation	32	9.14	0.048	S
			28	8		
	transposition	Upper 3	3	0.86	0.147	NS
		Upper 4	2	0.57		
	impaction	Upper 3	44	12.6	0.032	S
		Lower 3	19	5.43		
		Premolar	7	2		

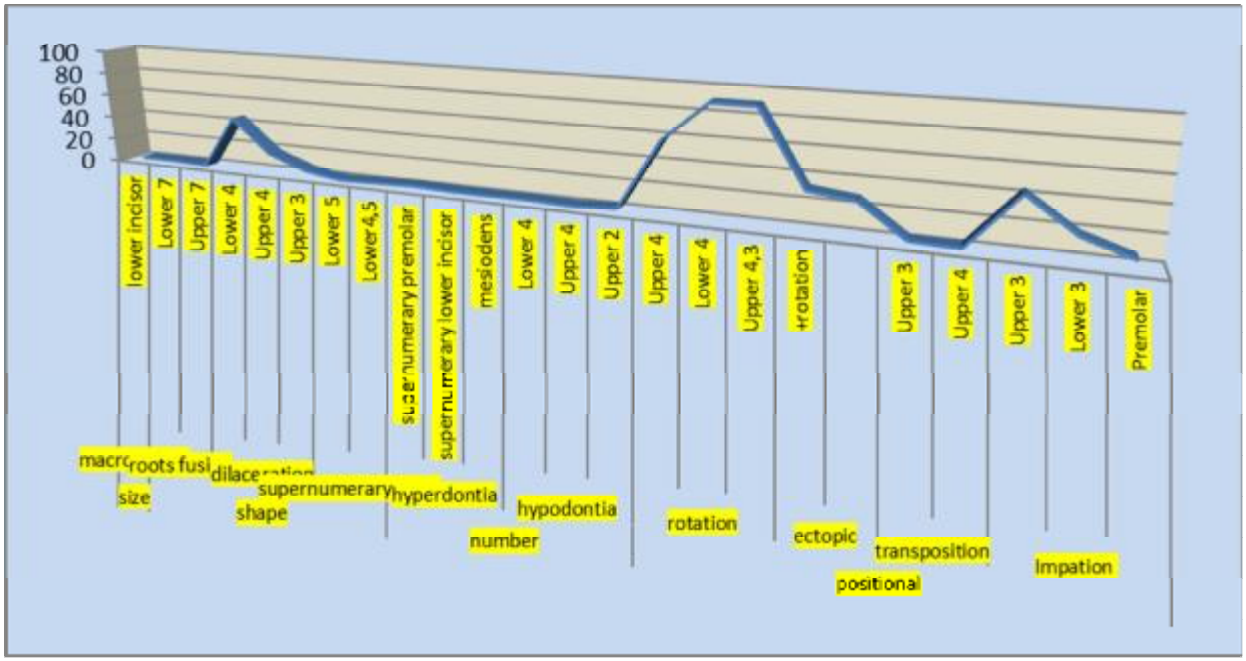

Figure 5.Distribution , location and prevalence of developmental dental anomalies according to types .

The Hypothesis between variables of size in macrodontia lower incisor and the significant difference , H1 =0.877 P>0.05 non Significant .The Hypothesis between variables of shape in roots fusion
and the significant difference , H1 =0.911 P>0.05 non Significant , but in dilacerations H1=0.953 P<0.05 Significant .and the supernumerary roots H1=0.943 P>0.05 Non significant .
The Hypothesis between variables of number inhyperdontiaand the significant difference , H1 =0.957 P<0.05 Significant ,and inhypodontia H1=0.924 P>0.05 Non significant .

The Hypothesis between variables of positional in rotation
and the significant difference , H1 =0.972 P<0.05 Significant ,but in ectopic H1=0.952 P<0.05 Significant, and in transposition H1=0.853 P>0.05 Non significant . In impaction H1 =0.968 P<0.05 Significant .

Table 5. Comparative analysis between different study age groups and gender of anamolies using p-values .

	P-vale	Sig
Age	0.036	P<0.05
Gender	0.041	P<0.05

*Significant
The Hypothesis between variables with age groups and the significant difference , H1 =0.964 P<0.05 Significant
The Hypothesis between variables with gender and the significant difference , H1 =0.959 P<0.05 Significant