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Research Article

**STUDY TO KNOW THE PREVALANCE OF DENTAL
ANOMALIES AMONG ADULT PEOPLE OF RAWALPINDI,
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⁴ Dr Aimen Zahid**¹BDS, Frontier Medical and Dental College Abbottabad²Associate Professor, Department of Prosthodontics, Baqai Dental College Karachi.³BDS, Baqai Dental College Karachi⁴BDS, Baqai Dental College Karachi**Abstract:**

Objective: This study was intended to determine the developmental of dental anomalies (DDA) among adults attending the outpatient dental Department of DHQ Hospital Rawalpindi. The data obtained are expected to increase the understanding of their etiology and also aid for better management and prevention.

Materials and methods: The materials were retrieved from the files of patients reporting to the dental Department of DHQ Hospital Rawalpindi over a period of four months from December 2018 to March 2019. Panoramic radiographs of 1000 patients (500 males and 500 females) with an age range of 18–40 years were examined for anomalies in teeth number, shape, size and position. Descriptive statistics was performed using SPSS 20 and the value of significance obtained using Chi square and Fisher exact test. The level of significance was set at 95% confidence level.

Results: The prevalence of DDA was 37.8% and distributed equally in both the sexes. The most common anomaly was rotation (20.2%) followed by ectopic eruption (7.6%). Microdontia (0.9%), supernumerary roots (0.7%), macrodontia (0.6%) and transposition (0.3%) were less common. The prevalence of rotation is statistically significant ($p < 0.05$).

Discussion and conclusion: A significant number of patients had DDA. The prevalence of rotation was high and associated with other common dental diseases. Comparison of our data with other studies showed variation in their prevalence suggesting the influence of genetic and environmental factors. The high prevalence of DDA suggests the need for proper diagnosis, intervention and treatment. Further research into etiological factors for dental anomaly presentation in adults could create awareness and guide preventive strategies to assist in minimizing the associated dental problems.

Keywords: dental anomalies, Tooth rotation, Panoramic radiographs, etiological factors.

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INTRODUCTION:

Developmental dental anomalies (DDA) are considered as an important category of morphological and structural dental variations. Their etiology is complex resulting from the influence of genetic, epigenetic and environmental factors.¹ Although genetic defects have been considered to be the most influential factor, etiological events in the prenatal and postnatal development period can further contribute to such anomalies.¹ Anomalies of tooth size (microdontia and macrodontia); shape (dens invaginates, talon cusp, dens evaginates, gemination, fusion, root dilacerations, taurodontism and concrescence); number (hypodontia, hypodontia and oligodontia); structure (amelogenesis imperfecta, dentinogenesis imperfecta and dentin dysplasia) occur due to disturbances in the embryological development of teeth during the morpho differentiation or histodifferentiation stages of development.² Positional anomalies such as rotation, ectopic eruption occur due to disturbances in the eruption pattern.² The knowledge of their prevalence and the degree of expression can provide valuable information for phylogenetic and genetic studies and also help in the understanding of differences among population and between various population groups.³ Many epidemiological studies on DDA have been conducted in different parts of the world showing geographic and ethnic variation in their prevalence.[4-10] Nevertheless, only a few studies have been conducted in Pakistan with differences in the prevalence of these anomalies due to variable sampling and diagnostic criteria.[11-15] The present study is intended to determine the prevalence of DDA among the adult peoples of Rawalpindi. The data obtained are expected to increase the understanding of their etiology which can further facilitate their diagnosis and effective management.

MATERIALS AND METHODS:

This retrospective cross sectional study was based on the evaluation of DDA on panoramic radiographs of 1000 outpatients attending the dental Department of DHQ Hospital Rawalpindi over a period of four months from December 2018 to March 2019. Digital computed panoramic radiographs of 500 males and 500 females with an age range of 18–40 years were considered for the study. Patients of this age group were selected to avoid misinterpretation caused by

delayed eruption or un-eruption of permanent teeth in young patients and also the regressive alterations or other dental diseases in 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 commonly exhibit variation in their morphology and position. In order to reduce radiographic misinterpretation, blurred image teeth were also excluded.

All subjects were in the permanent dentition stage and had panoramic radiographs taken by the same technician using the same x-ray device and the same standardized method. The radiographs were taken using Orthophos XG Sirona machine and images were processed with Sidexis Next generation software. The panoramic images were examined in a standardized manner under good lighting conditions, standardized screen brightness and resolution. All the radiographs were examined by an experienced clinician to eliminate inter examiner differences. Repeatability was tested on 20 randomly selected radiographs examined at least 2 weeks after the initial examination. The selected radiographs were reviewed for the following DDA: hypodontia, hypodontia, ectopic eruption, rotation, microdontia, macrodontia, transposition, gemination, fusion, dilacerations, taurodontism, dens evaginates, dens invaginates, talon cusp, concrescence, supernumerary roots and any other unusual dental conditions Descriptive statistics was performed for analyzing the data and group comparison was done with Pearson chi square test and Fisher's exact test. The level of significance was set at 95% confidence interval.

RESULTS:

Among the 1000 radiographs examined, a total of 378 (37.8%) had DDA which includes 192 (38.4%) males and 186 (37.2%) females (Table 1). Around 287 (28.7%) had at least one anomaly, 79 (7.9%) cases with two anomalies and only 12 (1.2%) exhibited more than two anomalies (Table 1). Both males and females were equally affected. Of these 378 anomalies, 290 (76.7%) occurred in the age group 18–30 years compared to 88 (23.3%) cases in 31–40 years range (Table 1). The most common anomaly was rotation 202 (20.2%) followed by ectopic eruption 76 (7.6%) and dilaceration 72 (7.2%). (Table 2).

Table 1. Distribution of developmental dental anomalies by age and sex.

Description	Males <i>n</i> (%)	Females <i>n</i> (%)	Age (18–30 years)	Age (31–40 years)	Total <i>n</i> (%)
	<i>n</i> = 500	<i>n</i> = 500	<i>n</i> = 500	<i>n</i> = 500	<i>n</i> = 1000
No dental anomaly	308 (61.6)	314 (62.8)	210	412	622 (62.2)
One dental anomaly	142(28.4)	145 (29.0)	216	71	287 (28.7)
Two dental anomalies	42 (8.4)	37 (7.4)	68	11	79 (7.9)
≥Two dental anomalies	8 (1.6)	4 (0.8)	6	6	12 (1.2)
Total subjects with dental anomalies	192(38.4)	186(37.2)	290	88	378 (37.8)

Table 2. Prevalence of developmental dental anomalies in the study group.

Dental anomalies	Males <i>n</i> (%)	Females <i>n</i> (%)	Total <i>n</i> (%)	<i>P</i> value
	<i>n</i> = 500	<i>n</i> = 500	<i>n</i> = 1000	
Rotation	114 (22.8)	88 (17.6)	202 (20.2)*	0.049*
Ectopic eruption	46 (9.2)	30 (6.0)	76 (7.6)	0.073
Transposition	2 (0.4)	1 (0.2)	3 (0.3)	1.000
Hypodontia	22 (4.4)	30 (6.0)	52 (5.2)	0.319
Hyperdontia	6 (1.2)	4 (0.8)	10 (1.0)	0.753
Taurodontism	13 (2.6)	16 (3.2)	29 (2.9)	0.707
Talons cusp	8 (1.6)	7 (1.4)	15 (1.5)	1.000
Dilaceration	28 (5.6)	44 (8.8)	72 (7.2)	0.066
Supernumerary roots	5 (1.0)	2 (0.4)	7 (0.7)	0.451
Microdontia	5 (1.0)	4 (0.8)	9 (0.9)	1.000
Macrodontia	3 (0.6)	3 (0.6)	6 (0.6)	1.000

*Statistically significant ($p \leq 0.05$).

DISCUSSION:

The present study is the first large scale study of this type to be conducted in Rawalpindi region. A similar but small scale study was conducted almost two decades back involving selected DDA on children.¹³ Several studies have been conducted in other regions with variable sampling and conflicting results.[11], [12], But these studies have analyzed selected dental anomalies and have not reported their overall prevalence. The prevalence of DDA was close to that observed by Gupta et al on an Indian population⁶ and Uslu et al. on Turkish

population.⁸ Few studies have shown a higher prevalence, probably due to inclusion of third molars; a tooth that is known to exhibit anatomic variation.[7], [9] On the other hand, some studies were conducted on orthodontic patients who might have a greater tendency to show dental anomalies.[7], [8], [10], [12] Many studies have focussed on outpatient dental patients, similar to this study.[6], [9], [11], The present study ascertains the prevalence rate in adults unlike other studies which have been conducted in children with mixed dentition.[13], [15] There is no statistically

significant difference between both the sexes in congruence with other studies.[6], [12], [15] 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.[9], [14]

Rotation was the most frequent dental anomaly in the present study. The exclusion of this entity in most studies, is mainly because of the argument that rotation is not developmental., [14], [15] But literature cites that the etiology of rotation is multifactorial and based on pre-eruptive and posteruptive disturbances.¹⁶ 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. Only a single study has included this entity reporting only half of the prevalence rate noted in this study.⁶ Maxillary first premolars were commonly rotated with most of the cases showing ectopic eruption of adjacent maxillary canines. Few cases have been observed in patients with impacted canine which could be a likely cause for this anomaly. Furthermore, the prevalence of dental caries in children is substantially high in this region¹⁷ with many cases of extracted deciduous molars which could further lead to rotation of succedaneous teeth. Rotated teeth are predisposed to alveolar bone loss when compared to normally positioned teeth.¹⁸ Since rotation is high in this population, the dentist should be aware of their possible sequelae and therefore advocate appropriate therapeutic measures. The prevalence of ectopic eruption was rather high compared to other studies.[11], [12] Gupta et al.⁶ showed almost equal prevalence on Indian population whereas the rate reported by Thongudomporn et al.⁷ on Australian population is quite high. An interesting finding is that the prevalence of retained deciduous teeth in this study population was higher, contributing for the increased occurrence of ectopic eruption. Maxillary canine was the most common ectopically erupted tooth supporting the findings of previous studies.[6], [7], [8] Root dilaceration was present in 7.2% of cases which was significantly greater than those observed in other studies., [9], [11], [14] Possibility of misdiagnosis of dilaceration is greater with panoramic radiographs as it is difficult to identify the root angulation in labial and lingual directions. The prevalence of hypodontia was significantly lower compared to other studies,[8], [10] due to exclusion of third molars. Maxillary lateral incisor was the most

common missing tooth, similar to the findings of Ghaznawi et al.¹⁴ The cause for hypodontia is mostly genetic but some environmental factors like trauma in the tooth bearing areas like fractures, surgical procedures and extraction of primary teeth can also contribute to this condition.¹⁹ Few cases of hypodontia were observed in families supporting their genetic etiology.

The prevalence of supernumerary teeth was similar to other studies except the one by Osuji et al.¹⁵ who has reported a higher rate due to the inclusion of deciduous dentition. Although the prevalence of taurodontism was lower than that observed by Thongudomporn et al.⁷ and Ghaznawi et al.,¹⁴ it was comparatively higher than most studies.[8], [9], [11] High prevalence of vitamin D deficiency in this population can account for this rather increase in taurodontism.²⁰ Talon's cusp accounted for 1.5% with almost equal unilateral and bilateral occurrence. But the incidence of talon's cusp reported by Osuji et al.¹⁵ was markedly high, probably due to the inclusion of deciduous dentition along with permanent dentition. Transposition was observed in 3 cases (0.3%) involving maxillary lateral incisor, canine and first premolar similar to the findings of Ghaznawi et al.¹⁴ This can be attributed mostly to genetic factors.²¹

Supernumerary root was noted in only 7 patients (0.7%). Many studies have not included this entity except for Kositbowornchai et al.¹⁰ with a slightly higher prevalence of 2.2%. Their determination, however is difficult in panoramic radiographs as it represents a two dimensional image with more chances of misdiagnosis due to overlapping of normal anatomic roots. The incidence of microdontia (0.9%) was comparatively lower in this study unlike other studies due to exclusion of third molars.[10], [14] Similar to other studies, the prevalence of macrodontia was also lower.[10], [14] Structural anomalies were not considered in this study, as it would be difficult to detect them in radiographs thereby warranting clinical examination along with radiographic evaluation.

CONCLUSION:

A significant number of subjects had dental anomaly. The prevalence of rotation is strikingly high and associated with other dental problems. Both males and females were equally affected. Comparison of our data with similar studies in Pakistani or other populations showed variations and higher prevalence. This may be due to genetic and environmental influence on tooth

development. The high prevalence of DDA highlights the need for raising awareness about their diagnosis, intervention and treatment as they may complicate treatment of other dental diseases. Within its limitations, our study presents the prevalence and distribution of DDA and also proposes the possible contributing factors that could be related to these anomalies. Further research into etiological factors for dental anomaly presentation in adults in Pakistan could create awareness and guide preventive strategies to assist in minimizing the associated dental problems.

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