Research Article

DEVELOPMENTAL DENTAL ANOMALIES PREVALENCE AMONG ADULT POPULATION OF NORTH INDIA-A RETROSPECTIVE STUDY

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ABSTRACT

This study was proposed to determine the prevalence of developmental dental anomalies (DDA) among north Indians.

The data was collected randomly from the case sheets of patients reporting to the OPD in various Department of Faculty of Dental Sciences, King George's Medical University (KGMU), Lucknow, India over a period of one year (December 2014-December 2015). Panoramic radiographs of 1150subjects (630 males and 520 females) within the age group of 18–40 years were examined for the presence of various dental anomalies. Illustrative statistics was performed using the Statistical Package for Social Science (SPSS) Version 16.0(Chicago, Inc., USA).

The prevalence of DDA was 493 (42.9%) which includes 292 (59.2%) males and 201 (40.8%) females. Of these 493 anomalies, 373 (62.4%) occurred in the age group 18–30 years compared to 120 (21.6%) cases in 31–40 years range The most common anomaly among north Indians were rotation 202 (40.9%) followed by ectopic eruption 80 (16.2%) and dilacerations 66 (13.3%) respectively.

A notable number of patients had DDA. The prevalence of rotation was high in number and linked with other common occurring dental diseases. The high prevalence of DDA recommends the need for proper diagnosis, intervention and treatment. Future research into etiological factors for dental anomaly presentation in adults in north India could create awareness and guide preventive strategies to help in minimizing the linked dental complications.

INTRODUCTION

Developmental dental anomalies (DDA) are an important category of dental morphological variations in most of the human population all over the world. Their etiology is complex resulting from the influence of genetic, epigenetic and ecological factors (1). Although genetic defects have been considered to be the most influencing factor, etiological events in the prenatal and postnatal development period can further caused to such anomalies. 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 (amelogenesis imperfecta, dentinogenesis imperfecta and dentin dysplasia) occur due to interference in the embryological development of teeth during the morphodifferentiation or histodifferentiation stages of development (2). Positional anomalies such as rotation, ectopic eruption occur due to disturbances in the eruption pattern (2). The awareness of their prevalence and the degree of expression can furnish valuable information for phylogenic and genetic studies and also help in the understanding of differences among population and between different population groups (3). Many epidemiological studies on DDA have been carried out globally showing geographic and ethnic variation in their occurrence (4-10). Nevertheless, only a few studies have been supervised in north India with differences in the prevalence of these anomalies (11-15).

The present study is aimed to determine the presence of various DDA through examination of panoramic radiographs among the adult population of north India to increase the understanding of their cause which can further ease their diagnosis and effective management in current scenario.

MATERIALS AND METHODS

This retrospective study was carried out on the evaluation of DDA on panoramic radiographs of 1150 outpatients attending the OPD in various Department of Faculty of Dental Sciences, King George's Medical University (KGMU), Lucknow, India over a period of one year (December 2014 - December 2015).

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Digital computed panoramic radiographs of 630 males and 520 females of North Indian origin within the age group of 18–40 years were examined for the presence of various dental anomalies. All subjects were in the permanent dentition stage and had panoramic radiographs taken using the same x-ray device and the same standardized method by the same technician. The radiographs were taken using Orthophos XG Sirona machine and images were processed with Sidexis Next generation software. The panoramic radiographs were examined on standard light boxes, under good lighting conditions, standardized screen brightness and resolution to examine the dental anomalies. All the radiographs were examined by an experienced clinician to eliminate inter examiner differences. The selected radiographs were reviewed for the following DDA: hypodontia, hyperdontia, ectopic eruption, rotation, microdontia, macrodontia, transposition, gemination, fusion, dilacerations, taurodontism, dens evaginatus, dens invaginatus, talon cusp, concrescence, supernumerary roots and any other unusual dental conditions. After the examination of the radiographs, patients who revealed any pathological conditions, trauma or fracture of the jaw that might have influence the normal growth of permanent dentition or any hereditary diseases or syndromes were excluded from the present study. Illustrative statistics was performed using the Statistical Package for Social Science (SPSS) Version 16.0(Chicago, Inc., USA). A P-value less than 0.05 were considered statistically significant.

RESULTS

The study comprised of 630 males (54.8%) and 520 females (45.2%) with an age range of 18 to 40 years with a mean age of 22.1 years. Out of the 1150 radiographs examined, a total of 493 (42.8%) had DDA which includes which includes 292 (59.2%) males and 201 (40.8%) females (Table 1).

(62.4%) occurred in the age group 18–30 years compared to 120 (21.6%) cases in 31–40 years range (Table 1). The most common anomaly was rotation 202 (40.9%) followed by ectopic eruption 80 (16.2%), dilacerations66 (13.3%), hypodontia 47(9.5%) and taurodontism 29(5.88) respectively (Table 2).

DISCUSSION

This is the first study to be carried out in northern part of India. Several studies have been carried out in other regions of India with variable sampling and conflicting results. The prevalence of DDA was very high to that observed on an Indian population by Gupta *et al*. (6) and Uslu *et al*. on Turkish population (8). Few studies have shown a similar prevalence, probably due to inclusion of third molars; a tooth that is known to exhibit anatomic variation (7, 9). While, some studies might have a greater tendency to show dental anomalies (10, 12). Various studies have focused on outpatient dental patients, similar to this study (13-15). The present study confirms 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 (11-12, 15). The female predominance in few 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 (14).

Rotation was the most common dental anomaly in the current study. The exclusion of this entity in most studies, is mainly because of the argument that rotation is not developmental (7-15). But literature cites that the etiology of rotation is multifactorial and based on pre-eruptive and posteruptive disturbances (16).

Table 1 Distribution of developmental dental anomalies by age and gender

Category	Males *n* (%)	Females *n* (%)	Age		Total *n*(%)
			(18-30 yrs)	(31-40 yrs)	
	n = 630	*n* = 520	*n* = 597	*n* = 553	*n* = 1150
No dental anomaly	338(53.65)	319(61.35)	224(37.52)	433(78.30)	657(57.13)
One dental anomaly	192(30.48)	149(28.65)	256(42.88)	85(15.37)	341(29.65)
Two dental anomalies	67(10.63)	41(7.88)	88(14.74)	20(3.62)	108(9.39)
More than two dental anomalies	33 (5.24)	11(2.12)	29(4.86)	15 (2.71)	44(3.83)
Total subjects with dental anomalies	292(46.35)	201(38.65)	373(62.48)	120(21.69)	493(42.87)

Table 2 Prevalence of developmental dental anomalies

Dental anomalies	Males *n* (%)	Females *n* (%)	Total *n* (%)	*P* value
	n = 292	*n* = 201	*n* = 493	
Rotation	124(42.47)	78(38.81)	202(40.97)	0.472
Ectopic eruption	56(19.18)	24(11.93)	80(16.23)	0.043*
Transposition	6(2.05)	1(0.50)	7(1.42)	0.249
Hypodontia	22(7.53)	25(12.44)	47(9.53)	0.095
Hyperdontia	8(2.74)	4(1.99)	12(2.43)	0.769
Taurodontism	15(5.14)	14(6.97	29(5.88)	0.513
Talons cusp	11(3.77)	7(3.48)	18(3.65)	0.868
Dilaceration	28(9.59)	38(18.91)	66(13.39)	0.004*
Supernumerary roots	7(2.40)	3(1.49)	10(2.03)	0.746
Microdontia	8(2.74)	4(1.99)	12(2.43)	0.769
Macrodontia	7(2.40)	3(1.49)	10(2.03)	0.746

*Statistically significant ($p < 0.05$)

Around 341 (29.8%) had at least one anomaly, 108 (8.6%) cases with two anomalies and only 44 (2.2%) exhibited more than two anomalies (Table 1). Of these 493 anomalies, 373

Various 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 linked with other dental problems in this research supporting their multifactorial cause. Maxillary first premolars were frequently rotated with most of the cases showing ectopic eruption of similar maxillary canines. Few cases have been noted in patients with impacted canine which could be a cause for this anomaly. Additionally, the occurrence of dental caries in children is substantially high (17) with many cases of extracted deciduous molars which could further lead to rotation of succedaneous teeth. Rotated teeth are make vulnerable to alveolar bone loss when juxtaposed to normally positioned teeth (18). That's why rotation is more in these subjects, the dentist should be conscious of their possible sequelae and therefore advocate suitable therapeutic measures.

The prevalence of ectopic eruption was high compared to other studies carried out in Saudi population (11-12). Gupta *et al.*(6) also showed lower prevalence on Indian population whereas the rate reported on Australian population is quite similar (7). An interesting finding is that the retained deciduous teeth prevalence in this research population was higher, causing for the increased occurrence of ectopic eruption. Maxillary canine was the most common ectopically erupted tooth supporting the findings of previous studies (8,12).

The prevalence of hypodontia was significantly higher compared to other studies due to exclusion of third molars (8, 10). Maxillary lateral incisor was the most common missing tooth, similar to the observations of other study (14). The cause for hypodontia is mainly genetic but some factors like trauma in the tooth bearing areas like fractures, surgical procedures and extraction of primary teeth can also cause to this condition (19).

The prevalence of supernumerary teeth was similar to other studies carried out in Saudi Arabia (11-12, 14) except the one who has outlined a higher rate due to the inclusion of deciduous dentition (15). Although the prevalence of taurodontism was lower than that observed by Gomes *et al.* (7) and Ghaznawi *et al*. (14), it was comparatively higher than most studies (8-9, 11). High occurrence of vitamin D deficiency can account for this rather increase in taurodontism in this population (20). Transposition was observed in 7 cases (1.4%) involving maxillary lateral incisor, canine and first premolar similar to the results of study carried out by Ghaznawi *et al*. (14).Supernumerary root was noted in only 10 patients (2.0%). Various studies have not included this entity except for Kositbowornchai *et al.*(10) with similar prevalence of 2.2%. The incidence of microdontia (2.4%) was comparatively higher in this study unlike other studies (10,14). Similar to other studies, the prevalence of macrodontia was also higher (10,14). In this research structural anomalies were not considered, as it would be difficult to detect them in radiographs. Somestudies have shown significant differences in the prevalence of DDA in different populations (4-10).A reasonable explanation for these observations may be due to differences in study design, diagnostic criteria, sampling techniques; racial dissimilarities; effect of environmental factors and of nutritional status on tooth development.

CONCLUSION

A significant number of Indian subjects had dental anomaly. The DDA, rotation occurrenceis comparatively high and related with other dental problems. Both genders were equally affected. The DDA high prevalence highlights the necessity for raising awareness about their diagnosis, intervention and treatment as they may complicate treatment of other dental diseases. Within its limitations, this research presents the prevalence and distribution of DDA and also determines the contributing factors that could be responsible to these anomalies. Future research into causing factors for dental anomaly among adults in North India could create awareness and guide preventive strategies to help in minimizing the related dental problems.

References

1. Santosh P, Bharati D, Sumita K, Farzan R. Prevalence of dental anomalies in Indian population.2013.
2. Guttal KS, Naikmasur VG, Bhargava P, Bathi RJ. Frequency of developmental dental anomalies in the Indian population. *European journal of dentistry*. 2010 Jul; 4(3):263.
3. H. Yaacob, P. Nambiar, M.D.K. Naidu. Racial characteristics of human teeth with special emphasis on the Mongoloid dentition.18 (1) (1996), pp. 1–7
4. S.J. Tsai, N.M. King. A catalogue of anomalies and traits of the permanent dentition of southern Chinese. *J ClinPediatr Dent*, 22 (3) (1998), pp. 185–194.
5. A.F. Ezoddini, M.H. Sheikhha, H. Ahmadi. Prevalence of dental developmental anomalies: a radiographic study. Community Dent Health, 24 (3) (2007), pp. 140–144.
6. S.K. Gupta, P. Saxena, S. Jain, D. Jain. Prevalence and distribution of selected developmental dental anomalies in an Indian population. *J Oral Sci*, 53 (2) (2011), pp. 231–238.
7. Gomes RR, Da Fonseca JA, Paula LM, Faber J, Acevedo AC. Prevalence of hypodontia in orthodontic patients in Brasilia, Brazil. *The European Journal of Orthodontics*. 2010 Jun 1; 32(3):302-6.
8. O. Uslu, M.O. Akeam, S. Evirgen, I. Cebeci. Prevalence of dental anomalies in various malocclusions. *Am J Orthod DentofacialOrthop*, 135 (2009), pp. 328–33.
9. S. Nemati, Z. Dalili, N. Dolatabadi, A.S. Javadzadeh, *et al.* Prevalence of developmental and acquired dental anomalies on digital panoramic radiography in patients attending the dental faculty of Rasht, Iran. *J Dentomaxillofac Radiol Path Surg*, 1 (2) (2012), pp. 24–3
10. S. Kositbowornchai, C. Keinprasit, N. Poomat. Prevalence and distribution of dental anomalies in pretreatment orthodontic Thai patients. KDJ, 13 (2) (2010), pp. 92–100.
11. Afify A.R, Zawawi K.H. The prevalence of dental anomalies in the western region of Saudi Arabia. ISRN dentistry 2012; Article ID: 837270. doi:10.5402/2012/837270.
12. Aljazi H.A. A sudy on dento/skeletal discrepancies and dental anomalies in a sample of Saudi orthodontic patients. Thesis. Riyadh. King Saud University 2010.
13. G. Salem. Prevalence of selected dental anomalies in Saudi children from Gizan region. Commun Dent Oral Epidemiol, 17 (3) (1989), pp. 162–163.
14. H.I. Ghaznawi, H. Daas, O. Salakon. A Clinical and radiographic survey of selected dental anomalies and

conditions in a Saudi Arabian population. *Saudi Dent J*, 11 (1) (1999), pp. 8–13.

15. O.O. Osuji, J. Hardie. Prevalence of dental anomalies. Saudi Dent J, 14 (1) (2002), pp. 11–14.

16. Y.H. Kim, F.R. Shiere, H.R. Fogels. Pre-eruptive factors of tooth rotation and axial inclination. *J Dent Res*, 40 (1961), pp. 548–557.

17. Ingle NA, Dubey HV, Kaur N, Gupta R. Prevalence of dental caries among school children of Bharatpur city, India. *Journal of International Society of Preventive & Community Dentistry*. 2014 Jan; 4(1):52.

18. B. Peretz, E.E. Machtei. Tooth rotation and alveolar bone loss. Quintessence Int, 27 (1996), pp. 465–468.

19. Dalili Z, Nemati S, Dolatabadi N, Javadzadeh AS, Mohtavipoor ST. Prevalence of developmental and acquired dental anomalies on digital panoramic radiography in patients attending the dental faculty of Rasht, Iran. *Journal of Dentomaxillofacial*. 2013 Feb 15; 1(2):24-32.

20. M.M. Mansour, K.M. Alhadidi. Vitamin D deficiency in children living in Jeddah, Saudi Arabia. *Indian J Endocrinol Metab*, 16 (2) (2012 Mar), pp. 263–269.

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How to cite this article:

Jitendra Rao. *et al*, 2016 Developmental Dental Anomalies Prevalence Among Adult Population of North India-A Retrospective Study. *Int J Recent Sci Res.* 7(12), pp. 14939-14942.