

Pattern of Developmental Dental Anomalies in Patients Visiting the Tertiary Hospital

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ABSTRACT

Background and objective: Dental anomalies are frequently encountered on clinical and radiographic examination in the maxillary and mandibular teeth. They are anomalies in tooth number, shape, structure and position which results from disturbances during the morpho-differentiation stage of development. Etiology is genetic or events in the prenatal and postnatal periods. This study was conducted to evaluate the frequency of developmental dental anomalies of size, number, and shape in patient visiting BPKIHS, tertiary care hospital in Eastern Nepal.

Methodology: This descriptive cross-sectional study included 1752 patients using purposive sampling method. After a written informed consent, all patients were screened for the presence of dental anomalies by comprehensive clinical examination followed by appropriate radiographs in patient having symptoms. Data was analyzed using Statistical Package for Social Sciences (SPSS, version 11.5.0 and Microsoft Excel.

Results: The sample group represented 11.52% of the patients attending our department. The number of male subjects were 835(47.7%) and female were 917 (52.3%). The dental anomalies prevalence seen was in order: combination 511 (29.2%), number 500 (28.5%), shape 497 (28.4%), structure 153(8.7%) and position 91(5.2%). Among shape anomaly, microdontia 556 (31.7%) was seen frequently and least was concrescence. Common number anomaly was hypodontia and supernumerary teeth. Impacted teeth was seen in 207(11.8%) individuals, primarily involving the canine. combination anomaly was seen in 24.63% subjects. The correlation between gender and different types of anomalies was significant.

Conclusion: The percentage of dental anomalies observed was high especially the combination variant. This can lead to complication of abscess, space infection, pericoronitis and cyst formation.

Keywords: Dental anomalies, Hypodontia, Impaction, Microdontia, Nepal.

INTRODUCTION

Dental anomalies are common frequently encountered on clinical and radiographical examination in the maxillary and mandibular teeth. They are anomalies in tooth number, shape, structure and position results that from disturbances during the morpho-differentiation stage of development. The etiology of these conditions is usually attributed to certain genes in addition to some etiological events in the prenatal and postnatal periods that may result in anomalies in tooth size, shape, position, number, and structure.¹⁻⁴

Although asymptomatic these anomalies can lead to clinical problems which include delayed or incomplete eruption of the normal series of teeth, attrition, compromised esthetics, occlusal interference, accidental cusp fracture, interference with tongue space causing difficulty in speech and mastication, temporomandibular joint pain and dysfunction, malocclusion, periodontal problems because of excessive occlusal force and increased susceptibility to caries.^{5,6}

Several studies have reported the frequency of dental anomalies in different regions. Studies quantifying the prevalence of dental anomalies in different countries representing persons of various ethnic origin have been carried out. However, study representing the dental anomalies in this region has not been done so far. The study was conducted to evaluate the frequency of developmental dental anomalies of size, number, and shape in patient visiting Dept of OMR, BPKIHS, tertiary care hospital in Eastern Nepal.

METHODOLOGY

This prospective cross sectional study was conducted in the Department of Oral Medicine and Radiology (OMR), College of Dental surgery (CODS), B.P Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. The institutional review committee approved the study (IERB/212/014). The study used convenient sampling method. Sample size calculation with prevalence of 5.4%, confidence interval of 95 % and absolute precision of 20% resulted to be 1751.85, hence, sample size of 1752 was included in the study.

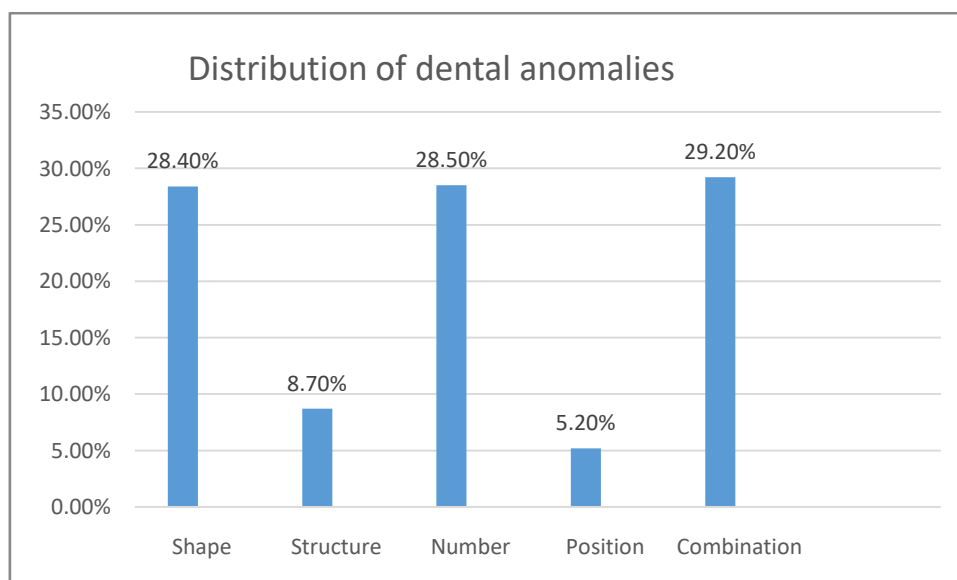
Patients with age ranging from 7 to 30 years visiting department for duration of 1 year were included in the study. The exclusion criteria were those with history of trauma or extraction or orthodontic or any other dental treatment, fracture of the jaws, hereditary condition or syndromes. After a written informed consent, all patients was screened by the principal author for the presence of dental anomalies by comprehensive clinical examination with appropriate radiographs, those not willing for radiograph was diagnosed clinically. A Performa sheet regarding the sociodemographic status, size, shape, structural, positional anomalies, and the family history was prepared to record the data.

Diagnosis was according to the descriptions by Neville⁹, and White and Pharoah¹⁰ such as: Shape anomalies: (microdontia, macrodontia, talons cusp, dens evaginatus, dens invaginatus, fusion, germination, twinning, concrescence, taurodontism and dilacerations); structural anomalies: (enamel hypoplasia, ameloogenesis imperfecta, dentigerous imperfecta, dentin dysplasia, and regional odontodysplasia), number anomalies: (hypodontia, oligodontia, anodontia, supernumerary, supplementary, and position anomalies: (impaction or combination of any along with associated pathology).

Data was analyzed comparing males and females. The differences between the groups was tested using the chi-square test. The Statistical analysis was done using software Statistical Package for Social Sciences (SPSS, version 11.5, Chicago, IL) for frequency, distribution and correlation with level of significance of 5% ($P < 0.05$).

RESULTS

The sample group comprised of 1752 patients who represented 11.52% of the patients attending the outpatient Department of Oral Medicine and Radiology, College of Dental surgery, Dharan, Nepal. The number of subjects included in the study were 835 (47.7%) male and 917 (52.3%) female. The mean age of subjects was 19.90 with $SD \pm 5.94$ with minimum of age being 7 and maximum of 30. The anomalies in descending order of prevalence were combination, number, shape and least was structural anomaly. The correlation between gender and different types of anomalies was not significant with (P value 0.000). 41 (2.3%) of patients had pathology associated with anomaly and that commonly was cyst or abscess or space infection.



Graph1: showing the distribution of different Dental anomalies.

The numbers associated with various anomaly has been briefly outlined under subheadings:

Shape anomaly:

Out of the 1752 patients, most common shape anomaly was microdontia affecting bilateral 144 (8.2%) lateral incisors, 98(5.6%)upper right maxillary third molar, followed by upper right lateral incisors, upper left lateral incisors and upper left maxillary third molar in order. Macrodonia was primarily seen in 52(3%) observations. It occurred in 9 (0.5%) left maxillary third molar and in 7(0.3%)maxillary left lateral incisors and second molars combined. Frequency of shape anomalies in sequence of common presentation was as follows: Microdontia 556 (31.7%), Talons cusp 98 (5.6%), Dens evaginatus 53 (3.0%), Macrodonia 52(3.0%), Taurodontism 50 (2.9%), Dens evaginatus28 (1.6%), Fusion 24(1.4%),Twining and Dilaceraton 22 (1.3%), Dens invaginatus 21(1.2%), Germination 15 (0.9%) and Concrescence 4(0.2%).

Structural anomaly: Amongst the structural anomaly, Enamel hypoplasia was most common seen in193(11.0%)observations, of which localized in 137 and generalized in 56 (3.2%).The consecutive structural anomalies in descending order were: Amoelogenesis imperfecta in 12 (0.7%) cases, Dentinal dysplasia in 3(0.2%) Dentinogenesis imperfecta in 2 (0.1%) cases, cases and rare ones were regional odontodysplasia 1(0.1%) case was also observed.

Number anomaly:The most frequent number anomalies seen in descending order are: hypodontia in 360 (20.5%), supernumerary teeth in 333(19%), retainedteeth in 266(15.2%) and oligodontia in 11(0.7%) observations. The male to female ratio was 1.79 with anomaly seen more in male. Hypodontia affected primarily bilateral maxillary lateral incisors and maxillary third molars.Mesiodens was most frequent supernumerary with 245 (14%) cases. Most common to observe was 121 (6.9%) conical variant and 23(1.3%) inverted type. Other types were pairedmesiodens in same direction and in different direction.Some more type ofsupernumerary cases were19 (1.1%) distomolar, 88(5.0%) paramolar, 16(0.9%) parapremolar, and 41(2.3%) supplementary. Retained teeth were seen in 266 (25.2%) observations. Frequently seen retained teeth was40 (2.3%) right maxillary deciduous canine. Subsequently, theorder followedby left maxillary canine in 31(1.8%) cases, left mandibular second molar in 22(1.3%) cases andright in 18(1%) cases, bilateral mandibular second molar in 18(1.0%) cases.

Positional anomaly: Highest frequency wasTransposition seen in 50 (2.9%) observations involvingleft maxillary canine and premolar- 15(0.9%) cases, right maxillary canine and premolar –16 (0.9%) cases. Impaction was seen in 207(11.8%) cases, affecting mostly the canine 105(5.9%), followed by premolar 58(3.3%), combination 24 (1.4%), second molars 8(0.5%), central incisors 7(0.4%), and lateral incisors 3(0.2%).The pathology associated with dental anomalies were 41(2.3%) with cyst, 33(1.9%) abscess or 8(0.5%)space infection in as shown in graph2.The genderwise association between different dental anomalies was significant with P value of .000 represented in (table1).

Table 1: showing the association between gender and different types of Dental anomaly.

Gender		Type of dental anomaly					P value
		Shape	Structure	Number	Position	Combination	
Male	Count	214	73	287	41	220	0.000
	% within Gender	25.6%	8.7%	34.4%	4.9%	26.3%	
	% type dental anomaly	43.1%	47.7%	57.4%	45.1%	43.1%	
Female	Count	283	80	213	50	291	
	% within Gender	30.9%	8.7%	23.2%	5.5%	31.7%	
	% type dental anomaly	56.9%	52.3%	42.6%	54.9%	56.9%	
Total	Count	497	153	500	91	511	
	% within Gender	28.4%	8.7%	28.5%	5.2%	29.2%	
	% type dental anomaly	100.0%	100.0%	100.0%	100.0%	100.0%	

DISCUSSION

Studies on prevalence of developmental dental anomalies in various countries across the world have shown anomaly distribution with respect to gender, arch and quadrant.²⁰ As, there were sparse epidemiological study on developmental dental anomalies in Nepal, the present study analyzed the prevalence and the pattern of associations of different dental anomalies in a large sample visiting the department of Oral Medicine and Radiology, College of dental surgery Dharan, Nepal. The male and female ratio was 0.91 with female affected more the males, our study showed female had more dental anomalies than male. Similar results have been reported Javali and Meti in Karnataka India.(19) The mean age of subjects was 19.90 with SD±5.94 with minimum age of 7 and maximum age

of 30. The sample group comprised of 1752 patients who represented 11.52% of the patients attending the outpatient Department of Oral Medicine and Radiology, College of Dental surgery, Dharan, Nepal.

Most prevalent shape anomaly was microdontia in 31.7%, mainly bilateral lateral incisors followed upper right maxillary third molar, upper right lateral incisors, upper left lateral incisors and upper left maxillary third molar. This is much higher than studies by Patil *et al.*, (7) Gupta *et al.*, (4) Kathariya *et al.*, (15) Buldur *et al.* (16) and Atac *et al.* (17). The reason for variation between their results might be attributed to the inclusion of the third molars and all the other dentition and diagnostic criteria used for identifying and classifying dental anomalies, genetic, and racial factors. Furthermore, the types of anomalies evaluated by those studies might be another reason for this inconsistency since previous studies investigated only a few types of anomalies, not all of them. Macrodonia was commonly observed in the left maxillary third molar 9(0.5%) followed by maxillary right third molars and mandibular third and second molars. Talons cusp involved the right and left maxillary lateral incisors. Dens evaginatus primarily affected mandibular left second premolar 11(0.6%) and mandibular left first premolar 9(0.5%). Among these, bilateral second premolar and bilateral mandibular first premolar had 0.3% of variation. Taurodontism was observed in mandibular and maxillary molars. Fusion was seen in mandibular lateral incisors 8(0.5%) and canine combined followed by mandibular central and lateral incisors 7(0.4%). Dilaceration was common in right mandibular molar 4(0.2%). Patient not consenting for radiograph and were excluded from the study. Hence, the detection of dilaceration was lesser in this study. Twinning involved the upper right and left lateral incisor. It was interestingly observed in deciduous canine, predominantly lower left canine tooth. Dens invaginatus was 16(0.9%) maxillary lateral incisors. Concrescence was present in 4(0.2%) cases involving maxillary and mandibular left second and third molar.

Structural anomaly: Enamel hypoplasia was seen in 193(11.0%) observations, localized in 137 and generalized in 56 (3.2%). The consecutive structural anomalies reported were Amelogenesis imperfecta in 12(0.7%), Dentinogenesis imperfecta in 2 (0.1%), Dentinal dysplasia in 3(0.2%) and rarest regional odontodysplasia. The prevalence rate of Amelogenesis imperfecta was 0.7% while only two Dentinogenesis imperfecta was seen in the study, which is higher than results reported by Gupta *et al.* (4) in Indian population. However these results are in contrast to the results in Nigerian population where structural anomaly was the most common form of dental anomalies *et al.* Temilola. (18)

Number anomaly: Hypodontia affected primarily bilateral maxillary lateral incisors were missing in 34(1.8%), left lateral incisors 30(1.7%), right maxillary third molar and left maxillary third molar in 24(1.4%) each, bilateral maxillary third molar -22(1.3%). Similar results have been seen in Indian population (2,4,11). The European and Caucasian populations mostly reported higher missing prevalence of the mandibular second premolar followed by either the maxillary or mandibular central incisors, or the maxillary second premolars (12,13). However, the mandibular lateral incisor appears to be the most frequently missing tooth in Japanese people. (2) Similarly, study by Al Emran reported maxillary lateral incisors were the most frequently missing teeth in Saudi Arabian School children than mandibular second premolar (14).

Positional anomaly: Impaction was seen in 207(11.8%), patients affecting mostly the canine, premolar, combination, second molars, central incisors, and least lateral incisors. Previous studies reported that the incidence of tooth impaction varies from 6.1% to 18.2% of the population. (21-23) Our study higher prevalence of impacted maxillary canine as reported by Sella Tunis T *et al.* (21) but contrary to other studies reporting third molar position and mandibular third molar agenesis as they were excluded in this study as there was literature from our previous study. (24,25) Local factors such as prolonged retention of deciduous teeth and supernumerary teeth were contributing to the impaction of the permanent teeth. Transposition was common left maxillary canine and premolar and right maxillary canine and premolar, the findings are similar to previous reported by Celikoglu *et al.* (26,27) The pathology associated with dental anomalies were 41(2.3%) with cyst 33(1.9%) and abscess or space infection in 8(0.5%). The literature on pathologies associated is limited though there are several case reports. The gender wise association between different dental anomalies was significant with P value of .000 with female predominance in all types of dental anomalies or combination except for number male significant higher prevalence which is in agreement with previous studies by Sella Tunis T *et al.*, Bilge *et al.*, Mallineni *et al.* (21,22,28) who reported higher prevalence of supernumerary tooth in males

CONCLUSION

The study evaluated the frequency of different developmental dental anomalies in a Eastern Nepali population. The percentage of dental anomalies was high specially combination, shape, number, position. This can lead to complication of abscess, space infection pericoronitis and cyst formation. Early detection of the anomaly can reduce the associated complication and the burden to the patient esthetically, financially and physically. So, these anomalies should be treated earlier to avoid further complications. Further different variant of anomalies need careful observation as they may be combination of anomalies present and documentation as they may be evidence for subject identification for forensic purpose.

RECOMMENDATION

The diagnosis was based primarily by clinical diagnosis thus identifying anomalies such as dilacerations, concrescence and impaction. With newer imaging modalities, future studies on dental anomalies should be based on using cone beam computed tomography. Studies on various pathologies associated with dental anomalies with histopathology correlation is recommended.

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Conflict of interest: None

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