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Original Article

Prevalence of Dental Developmental Anomalies in Patients Attending a Faculty of Dentistry in Ajman, United Arab Emirates

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Abstract

Objective: To determine the prevalence of dental developmental anomalies among patients visiting the dental clinics at Ajman University, United Arab Emirates. **Material and Methods:** This retrospective study consisted of 425 digital panoramic radiographs. The study sample included people in the United Arab Emirates who have visited the outpatient dental clinics at the Faculty of Dentistry, at Ajman University. These OPGs have been evaluated for the presence of dental anomalies such as: Macrodontia, Microdontia, Talon cusp, Taurodontism, Dilaceration, Ectopic Eruption, Supernumerary teeth or roots, Fusion, Gemination, and Concrescense. **Results:** 80.7% had at least 1 anomaly, with the maximum of 5 anomalies presented in 1.2% of the sample. Dilacerations were the most commonly identified anomaly (61.4%), followed by missing third molars (22.8%), and Ectopic Eruption (15.5%) where (12.9%) of this anomaly has affected the maxillary canines. Hypercementosis (10.2%) followed by Microdontia (4.6%), which was mostly seen in the Upper laterals. Taurodontism accounted for (4.1%), Macrodontia (2.3%) and Talon cusp (2.3%). Gemination, Dens Invaginatus, and Concrescence were separately present in 1.1%, each one, of the cases observed. **Conclusion:** Variations in data and results among different studies suggest the impact of racial, genetic and environmental factors. The high frequency of dental anomalies emphasize the need of early detection and diagnosis which can be achieved through radiographic imaging, this would aid in further awareness to minimize any means of complexity in dental problems.

Keywords: Tooth Abnormalities; Tooth, Supernumerary; Radiography, Panoramic.

Introduction

Dental developmental anomaly (DDA) is a deflection in an origin of a dental tissue resulting in a deviation in either the function, form or positioning of a tooth or a set of teeth [1]. Based on these three variations several types of dental developmental anomalies have been formed, the common groups are: supernumerary teeth or roots, hyperdontia, hypodontia, taurodontism, fusion, gemination, dilaceration, concrescence, hypercementosis, macrodontia, microdontia, dens invaginatus and evaginatus, talon cusp, ectopic eruption, and congenitally missing teeth seen in 25% of population [2].

Numerous published studies and researches have discussed the prevalence of developmental dental anomalies; however, the outcome of each single study have been heterogeneous and inconsistent due to the variety of ethnic & race groups, different diagnostic criteria used, and sampling method [2-7]. The etiology of these different types of developmental dental anomalies is not homogeneous in nature [6]. The complexity of the etiology of dental anomalies includes: genetic factors, etiological events during prenatal and postnatal fetal development, pathological and environmental factors [6,8,9]. These different types of dental anomalies are frequently seen in the dental clinic. Moreover, these anomalies generally account for a relatively low number; however dental anomalies manifested that they can lead to several complications in treatment planning, as well as in clinical management due to their presence alongside esthetic and functional problems [7].

Radiography plays a crucial role in the detection of these dental developmental anomalies, where it provides to the observers whether oral radiologists, dentists or clinicians several direct observational means; to obtain the proper diagnosis, prognosis, and treatment plan.

This study is aimed toward the detection and diagnosis of several types of developmental dental anomalies in the United Arab Emirates, among the population of Ajman city to raise awareness and comprehension of the etiology that can further assess an effective clinical management.

Material and Methods

Study Design and Data Collection

This is a retrospective cross sectional study that evaluated the prevalence of DDA in 425 visiting patients who attended the clinics of Ajman University of Science and Technology, United Arab Emirates between September 2014 and April 2016. The ages of the patients ranged from 10 to 60 years.

Inclusion criteria included all patients who presented anomalies such as: fusion, gemination, concresense, dens invaginatus, dens evaginatus, talon cusp, taurodontism, macrodontia, microdontia. hypodontia, hyperdontia, and supernumerary teeth and roots, ectopic eruption and dilaceration.

Exclusion criteria generally included: thirds molars as they exhibit several variations and skeletal defects that could affect the normal development of the head and neck region.

All the panoramic radiographs were taken using the Kavo Gendex GXDP-700 (Germany). The panoramic images were all reviewed under good lighting conditions with a standard screen resolution. The panoramic images were examined by 4 calibrated examiners 2 of whom were oral radiologists and 2 were general dentists. The interrater reliability was determined and an Intraclass Correlation Coefficient of 0.667 was obtained. Descriptive analysis of the data was performed.

Ethical Aspects

This study was approved by the Ethical Committee of College of Dentistry, Ajman University of Science and Technology (Ethical Approval Number: FR-2015/16-03).

Results

Among the 425 panoramic radiographs evaluated in this study, 80.7% (343) of the sample had at least 1 anomaly, with the maximum of 5 anomalies in 1.2% of the sample. Dilacerations were the most commonly identified anomaly (61.4%) followed by missing third molars (22.8%) and ectopic eruption (15.5%) where (12.9%) has affected the maxillary canines. Hypercementosis accounted for (10.2%) followed by microdontia (4.6%), which was mostly seen in the upper laterals. Taurodontism accounted for (4.1%), macrodontia (2.3%) and talon cusp (2.3%). Gemination, dens invaginatus, and concrescence were separately present in (1.1%) of the cases observed.

Table 1. Distribution of DDA according to various types.

Dental Anomalies	N (%)
Dilaceration	61.4 (206)
Missing Third Molars	22.8 (78)
Ectopic Eruption	15.5 (53)
Hypercementosis	10.2 (35)
Microdontia	4.6 (17)
Taurodontism	4.1 (16)
Macrodontia	2.3 (8)
Talon Cusp	2.3 (8)
Gemination	1.1 (4)
Concrescense	1.1 (4)
Dens Invaginatus	1.1 (4)

Discussion

This study is done to detect the anomalies in the dentofacial area among people living in this region, the data exhibits numerous ethnic and racial variations which can be clearly seen in patients addressing the dental clinics at Ajman University; which play a crucial role in the heterogeneity and inconsistency of the outcome, that was noticed in comparison with other conducted studies.

The prevalence of taurodontism (4.1%) and dilaceration (61.4%) present in this study is significantly higher compared to the conducted studies in Saudi Arabia [6,7]. The discrepancy in the frequency of taurodontism and dilaceration was also seen in comparison with the studies made on Indian population [4,10], in Iran [1] and Pakistan [11]. Previous authors found a higher

percentage in taurodontism (7.5%) [12] compared to this present study, which is similar to the frequency done on Jordanian population (8%) [13], and somewhat close among Indian population (11.8%) [14]. A study done on the Mexican population recorded a lower frequency of taurodontism (1%) and dilaceration (7.4%) [15] in comparison to this study. This variation among ethnic groups could be indicative of differences among various ethnic groups [1].

The distinction in the frequency primarily accounts for the variety in ethnic groups and genetic factors found in this sample. Missing third molars had a frequency percentage of 22.8% where it's almost similar to previous study (21.1%) [7]. Patil et al. [10] frequency for missing third molars (12.4%) was significantly lower compared to this present study. The prevalence of ectopic eruption in this current study accounted for (15.5%) with the majority affecting maxillary canines (12.9%), a percentage which is noticeably higher than the studies done on Saudi population (7.6%) [6], 0.3% [7] and 5% [16]. A previous research [6] showed a similar finding as maxillary canines was the most affected tooth in ectopic eruption (2.2%).

Previous reports regarding microdontia and macrodontia outcomes revealed notable differences compared to this current data. Studies done on Saudi population were remarkably lower, where microdontia was (0.9%) and macrodontia was (0.6%) [6]. Similarly, study on the Indian population showed microdontia frequency of (1%) and macrodontia in (0.2%) of their sample [10]. Others researchers exhibited a relatively closer data to this study [17,18].

Regarding talon cusp, the frequency of this data has taken (2.3%) of the total anomalies prevalence. Some authors have all displayed a fairly lower frequency in their samples [4,6,17].

As previously discussed, the majority of studies done by investigators around the world have shown numerous variations [2,4,5,12,19-21]. A plausible explanation for these observations may be due to differences in study design, diagnostic criteria, sampling techniques, racial differences, influences of environmental factors, and the effect of nutritional status on tooth development [6].

Conclusion

Several variations in data were noted between the current study and other studies in the same region, as well as in other regions of the world; which gives us a clear idea about the impact of racial, genetic, and environmental factors on the prevalence of dental anomalies. The overall frequency of dental anomalies seen in dental clinics or generally in a population accounts for a high number; which emphasize the importance of detecting and managing, as they exhibit various treatment management problems. Dental anomalies can be diagnosed with Radiographic imaging in the maxillofacial region, which can be significant in Detection, Diagnosis, and Treatment plan in dentistry. An early detection of dental anomalies is very vital as it would prevent the occurrence of further complications; and the earlier the diagnosis of a particular anomaly, the less complexity a treatment plan would be.

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