Original Article

PREVALENCE OF DENTAL ANOMALIES AMONG PATIENTS VISITING THE RIYADH ELM UNIVERSITY CLINICS

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ABSTRACT

The purpose of this study was to determine the prevalence of dental anomalies and the study of the participants based on age, gender, ethnicity, presence, type of anomaly, and systematic conditions. 385 Saudi, as well as non-Saudi patients' records, were examined by our group. This sample had been selected based on convenient sampling. Patients 18 or more years of age groups were included in this study with both Saudis and Non-Saudis being included. The findings of the investigation show that 47.8% of those tested had normal teeth, whereas 52.2% had at least one dental anomaly. The most prevalent dental anomalies among the study's participants were impactions (59.7%), congenitally missing teeth (24.9%), and dilacerations (11.65%). The study also identifies cases of other dental anomalies, including ectopic eruption (1%), odontoma (5.5%), and taurodontism (2.2%). The most common dental anomalies found were impactions, congenitally missing teeth, and dilacerations. However, no statistically significant association was observed when comparing the findings based on gender and nationality.

Key words: Dental anomalies, Prevalence, Dental patients, Riyadh Elm University.

Introduction

Dental anomalies are typical congenital deformities that can occur either as isolated findings or as a part of a syndrome [1-3]. Developmental anomalies affecting the morphology exist in both deciduous and permanent dentition and display several forms such as gemination, fusion, concrescence, dilaceration, dens evaginatus (DE), enamel pearls, taurodontism or peg-shaped laterals. All these anomalies have clinical significance in relation to aesthetics, malocclusion, and more necessary preparation for the development of dental decays and oral diseases [4, 5].

Congenital, developmental, and acquired dental abnormalities all affect the teeth and gums in some way. Congenital abnormalities are those that appear at birth and have a genetic cause; developmental anomalies appear throughout tooth development, and acquired malformations appear after teeth have fully developed [6, 7]. Both genetic and environmental variables have been associated with the development of dental abnormalities. Dental developmental abnormalities include anything from isolated problems to signs of more complex syndromes [8]. As a broad category, dental abnormalities include variations in tooth number, tooth shape, tooth size, and eruption timing. These abnormalities may cause malocclusion, greater sensitivity, and aesthetic concerns, and they can complicate dental procedures such as root canal therapy and tooth removals [6, 9].

Several dental anomalies of dentition are often witnessed in the dental clinic. Nevertheless, compared to the more frequently seen oral diseases including dental caries and periodontal diseases, these anomalies account for a comparatively low number, but can pose a problem during treatment planning. They comprise malocclusion, esthetic and functional problems, and potential disposition to other oral diseases. Therefore, their clinical management is usually intricate [10, 11].

A study done in Jeddah, Saudi Arabia revealed that the prevalence of patients that exhibited at least one dental anomaly was 396 (45.1%) patients. The prevalence of congenitally missing teeth was 226 (25.7%), impacted teeth 186 (21.1%), dilacerated teeth 10 (1.1%), supernumerary teeth 3 (0.3%), odontoma 1 (0.1%), and taurodontism was also 1 case (0.1%) of the total radiographs reviewed [12]. Another similar study in India reported that out of the 20,182 patients screened, 350 had dental anomalies. Of these, 57.43% of anomalies occurred in male patients and 42.57% occurred in females. Hyperdontia, root dilaceration, peg-shaped laterals (microdontia), and hypodontia were more frequent compared to other dental anomalies of size and shape [12, 13].

Several important links between different dental anomalies were found. Specifically, substantial associations were perceived between Supernumerary teeth and Impacted teeth, Tooth transposition; Odontomas and Impacted teeth; Hypodontia and Displacement of maxillary canines, Tooth Transposition; Impacted Teeth and Tooth Ankylosis, Tooth Transposition; Displacement of maxillary canines and Tooth Ankylosis. These associations may suggest common etiological factors for these conditions [14, 15].

Variations in tooth number, tooth form, tooth structure, exfoliation, and eruption are all signs of various dental abnormalities. An abnormality in growing teeth' exfoliation and eruption patterns causes dental abnormalities. This occurs during the morph differentiation stage of development. When planning dental and orthodontic care for a patient, it is essential to keep in mind the presence of any dental abnormalities the patient may have [10].

The frequency of dental abnormalities in certain groups has been the subject of many research efforts. Prevalence estimates for dental abnormalities have fluctuated from 5.46 percent to 74.7 percent across studies and populations [16]. The differences may be attributed to racial distinctions, sample techniques, and diagnostic standards. Many of these studies only provide findings for specific dental anomaly categories or subtypes. Although there is some information on the incidence of agenesis (5.5–7%) and molar incisor hypomineralization (MIH) (7.30–21.80%) across Europe, to the best of our knowledge, no studies have been carried out on European or French people. This study was done to estimate the frequency of each kind (based on the number of teeth, their shape, their structure, when they erupted, and when they fell out) among a sample of orthodontic patients in France [17, 18].

The research comprised 551 individuals undergoing orthodontic care at a French hospital between 2003 and 2013; of them, 252 (45.74%) had at least one tooth abnormality. The most prevalent abnormality was taurodontism (15.06%), followed by ectopic eruption (11.43%). No cases of odontoma, macrodontia, fusion, gemination, talon cusp, dentinogenesis imperfecta, regional odontodysplasia, early tooth eruption, or premature exfoliation were identified. It was revealed that there was no discernible link between the sexes and the prevalence of dental abnormalities [5].

Panoramic X-rays detected abnormalities in 39.2% of patients (46.0% in males and 54.0% in females). The most prevalent forms of anomalies in both sexes were those related to location (60.8%) and shape (27.8%), whereas size (8.2%), structure (0.2%), and number (17%) were the least common. The most common dental anomalies were impaction anomalies (45.5%), dilaceration anomalies (16.3%), hypodontia anomalies (13.8%), and taurodontism anomalies (11.2%). The prevalence of taurodontism increased between the ages of 13 and 19. Anomalies occur most frequently between the ages of 20 and 29 but could occur at any age [19, 20].

An important factor in the development of many forms of malocclusion is the presence of impacted teeth. The permanent maxillary canine has the longest eruption route of any permanent tooth because it forms furthest from the dental arch, near the nasal cavity. A route of ectopic protrusion of the canines toward the palate is seen in roughly 1.5% of the population. Apart from preventing the canines from erupting normally, this dental anomaly may have serious orthodontic consequences, including the root resorption of adjacent teeth in certain instances. It has been hypothesized by Sogra *et al*. (2012) that genetics play a crucial role in the development of palatally displaced canines [21]. Dental abnormalities tend to occur in clusters, with many cases sometimes being found in a single patient [21]. Five of the seven kinds of dental malformations studied in an untreated orthodontic population between the ages of 7 and 14 were shown to have substantial reciprocal relationships, suggesting they have a similar genetic basis. Patients with microdontia are more likely to have a palatally misplaced canine. Patients with conical upper lateral incisors were observed to have palatally displaced canines in 34% of cases [22]. Among 32 Japanese orthodontic patients, the authors showed that agenesis of the maxillary first molars was linked to an increased occurrence of various forms of permanent tooth agenesis. The frequency of agenesis of permanent teeth was shown to be 13-fold greater in persons without third molars compared to those with them [5, 23].

The rationale behind the study

Their incidence of dental anomalies and degree of expression in different population groups can provide important information for genetic studies and help the understanding of variations within and between the different populations.

Benefits of the study

The findings of this study will provide valuable information regarding the dental anomalies occurring in Saudi patients, which will help researchers focus on particular anomalies and work toward their epidemiology and treatment.

Hypotheses

The number of dental anomalies is low among the patients visiting REU clinics.

Study aims

- To measure the prevalence of various dental anomalies among Saudi and Non-Saudi patients.
- To determine the association of dental anomalies with gender and ethnicity.

Materials and Methods

Study design & sample

385 Saudi as well as non-Saudi patients' records were examined by our group. This sample had been selected based on convenient sampling. Patients 18 or more years of age groups were included in this study with both Saudis and Non-Saudis being included. Patients, less than 18 years of age were excluded from the study.

Sample size calculation:
Confidence level: 95%
Population Size: 2000
Margin of Error: 5%

Sample size: 385

Study instrument
A data sheet was used to record information regarding patients' age, gender, ethnicity, and prevalence of dental anomalies. Group members examined the OPGs of the patients included in the study.

Statistics
Collected data were analyzed using SPSS and frequencies were recorded. In order to determine any association between gender and ethnicity, a chi-square test was carried out keeping the value significantly less than 0.05.

Results and Discussion

Table 1. Descriptive statistics of the responses recorded for study participants.

Variables	Frequencies
Age	Mean age 33.57 (SD 13.53)
Gender	Male: 61.3% Female: 38.7%
Ethnicity	Saudi: 79% Non-Saudi: 21%
Presence of Anomaly	Yes: 47.8% No: 52.2%
Type of anomaly	Congenitally missing: 24.9% Impactions: 59.7% Ectopic eruption: 1% Dilaceration: 11.6% Odontoma: 0.5% Taurodontism: 2.1%
Systemic condition	Yes: 16.7% No: 83.3%

The statistical responses collected regarding the prevalence of dental abnormalities among the study participants are presented in **Table 1**. The results of the study indicate that the average age of the participants was 33.57%. According to the gender statistics, there are 61.3% of male students and 38.7% of female students currently enrolled. The result also shows the nationality of the participants, which shows that 79% of them are Saudi, and 21% are from a nation other than Saudi Arabia. The primary result, which is displayed in the table, is the number of individuals who are affected by the dental anomaly, and the result obtained from the analysis reveals that 47.8% of those examined had some form of dental aberration, while 52.2% of those examined did not have any form of dental anomaly. Impactions (59.7%), congenitally absent teeth (24.9%), and dilacerations (11.65%). These are the three most common types of dental abnormalities discovered in the participants of this study. Other types of dental anomalies, such as ectopic eruption (1%), odontoma (5.5%), and taurodontism (2.2 %), are identified through the study as having occurred in individuals. **Table 1** further reveals that 16.7% of the patients suffered from some kind of systemic ailment.

Table 2. Comparison between gender regarding the presence and type of dental anomaly.

	Male	Female	
Presence of anomaly	Yes: 48.1% No: 51.9%	Yes: 51.9% No: 48.1%	.395
Type of anomaly	Not applicable: 51.2% Congenitally missing: 12.5% Impactions: 28.8% Ectopic eruption: 0% Dilaceration: 5.6% Odontoma: 0% Taurodontism: 1.7%	Not applicable: 48.9% Congenitally missing: 12% Impactions: 30.8% Ectopic eruption: 1.3% Dilaceration: 6% Odontoma: 0.6% Taurodontism: 0%	.277

Table 2 illustrate the gender comparison regarding the presence and type of anomaly. After analyzing the value of P, the result reveals that there is not much difference between gender. Of the male participants who are suffering from the anomaly, 48.1% and 51.9% are female participants' other most important comparison is the type of an anomaly which depict that 51.2% are male and 48.9% are female in which disease are not applicable, whereas other types such as congenitally missing have suffered from 12,5% male and 12% female. The impactions are another type of anomaly containing 28.8% male and 30.8% female. The result shows that ectopic eruption and odontoma are the types of dental anomaly that are present in females (1.3% and 0.6%) and males having no signs of ectopic eruption and odontoma as we compare gender basis. The other type of anomaly is dilaceration, and Taurodontism which is present in the male, is 5.6, and 1.7%, and the female gender has 6% dilaceration and no signs of Taurodontism.

Table 3. Comparison between ethnicities regarding the presence and type of dental anomaly.

	Saudi	Non-Saudi	
Presence of anomaly	Yes: 49% No: 51%	Yes: 51% No: 49%	.214

Type of anomaly	Not applicable: 49.3% Congenitally missing: 12.5% Impactions: 13.5% Ectopic eruption: 0.6% Dilaceration: 5.6% Odontoma: 0.5% Taurodontism: 1.32%	Not applicable: 54.4% Congenitally missing: 7.5% Impactions: 31.6% Ectopic eruption: 0% Dilaceration: 6.3% Odontoma: 0% Taurodontism: 0%	.656

Table 3 presents a comparison of nationalities in terms of the presence of anomalies and the types of abnormalities found. The results of the analysis of the P value indicate that there is not a significant difference between the various ethnic groups. The percentage of Saudi participants who are affected by an anomaly is 49%, while the percentage of non-Saudi participants who are affected by an anomaly is 51%. The other most important comparison is the type of anomaly, which depicts that 49.3% of Saudis and 54.4% of non-Saudis are affected by anomalies in which disease is not applicable, whereas other types of anomalies, such as congenitally missing, have affected 12.5% of Saudis and 7.5% of people whose nationality is The impactions are a different kind of oddity in which participants with Saudi nationality make up 13.5% of the total, whereas participants without Saudi nationality make up 31.6% of the total. The findings indicate that ectopic eruption, odontoma, and Taurodontism are the forms of dental anomaly that are prevalent in Saudi Arabia (at a rate of 0.6%, 0.5%, and 1.32% respectively), whereas non-Saudis do not exhibit any signs of ectopic eruption, odontoma, or Taurodontism when the two groups are compared based on nationality.

In this particular study, there is a male population that is 38.7% affected by anomalies. There were no statistically significant associations found between the sexes and dental malformations, except for microdontia and ectopic eruption, both of which were exclusively identified in females. In both the overall sample and the study groups, there were a greater number of female participants. When it comes to particular dental abnormalities, some writers observed statistically insignificant differences, while others reported significant variations between the sexes.

According to research, dental anomalies are caused by strong genetic factors, despite their relatively modest occurrence rate, which ranges between 2.4% and 4.8% [24]. Basdra *et al*. (2000) discovered a greater rate of congenital tooth anomalies, which came in at 56.6% in 267 cases, whereas our research only uncovered 29.4% of such cases [25].

Thongudomporn and Freer (1998) reported that a significantly higher rate of dens invaginatus (26.1%) was observed in a group of patients [26]. However, no such cases were seen in our study. Impactions (59.7%), congenitally missing teeth (24.9%), and dilacerations (11.65%) are the three most prevalent types of dental abnormalities observed in the participants of our study that looked at several types of dental abnormalities. The previous study found that people of Mongoloid heritage are more likely to have dental anomalies (ectopic eruptions and dilacerations), with an average incidence of 2.2% and a higher prevalence in the maxillary incisors than previously reported [27, 28].

Impactions were found to have a prevalence of 59.7% in the population, according to the findings of this study, which is comparable to the findings of previous studies. According to the findings of another study, the incidence of impaction was determined to be 15.5%, which is lesser than what was observed in our study. According to Afify and Zawawi's findings [12], the prevalence of impacted teeth was 21.2%. Canines were found to be the most frequently impacted teeth in this study, excluding third molars, with a prevalence of 3.1%. This finding is a significant reduction from the findings of studies conducted by Fardi *et al*. (2011), who reported a prevalence of 8.8% in the Greek population for impacted teeth [29].

The research analyses the gender and nationality comparisons and concludes that the P value is greater than 0.05, which indicates that there is not much of a correlation between the two factors. Paranaiba *et al*. (2013) reported that the most common types of anomalies were tooth agenesis (47.5%), impacted teeth (13.1%), and microdontia (12.7%) and found a statistically significant association between genders [30].

Limitations and future recommendations

This study was conducted using the patient files from one campus of REU, therefore it may lack generalizability. Moreover, some of the previous studies included a much larger sample size as compared to our study; therefore we can increase the sample size to improve the accuracy of our findings and record the prevalence of rare anomalies as well.

Conclusion

The most common dental anomalies found were impactions, congenitally missing teeth, and dilacerations. However, no statistically significant association was observed when comparing the findings based on gender and nationality. Finally, more samples might be needed to record the prevalence of other anomalies.

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Ethics statement: This study fulfills the ethical requirement of the REU ethical committee.

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