TMP UNIVERSAL JOURNAL OF RESEARCH AND REVIEW ARCHIVES

VOLUME 3 | ISSUE 4 | YEAR 2024 | OCT_DEC 2024

RECEIVED DATE	ACCEPTED DATE	PUBLISHED DATE
30/09/2024	30/10/2024	05/11/2024

Article Type: Research Article

Available online: www.tmp.twistingmemoirs.com

ISSN 2583-7214

PREVALENCE OF DEVELOPMENTAL DENTAL DISORDERS AMONG THE PATIENTS VISITING REU CLINICS: A RETROSPECTIVE STUDY

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ABSTRACT

Introduction: Developmental abnormalities related to teeth, including variations in number, size, and structure, are common in both primary and permanent dentition. These anomalies, affecting 1% to 10% of permanent teeth, can lead to malocclusion, aesthetic issues, and increased risk of oral diseases.
Aims of the study: To evaluate the prevalence of developmental issues across genders, racial/ethnic groupings, and institutional contexts.
Materials and methods: This retrospective study employed patient data from the Dentoplus system. Every patient file will be evaluated using bitewings, history, charting, and OPGs; any irregularities discovered were documented.
Results: The most common developmental dental disorder was congenitally missing teeth and impactions. There are notable disparities in the occurrence of dental malformations among Saudi patients according to gender, nationality, or medical history. This implies that the development of dental abnormalities may be more significantly influenced by causes other than these.
Conclusion: In conclusion, 33% of people have dental abnormalities. When gender, nationality, and medical history were examined, no substantial difference was found.

Keywords: Developmental disorders, dental anomalies, prevalence, dental patients.

INTRODUCTION

Variations in the number, size, and form of teeth are characteristics of dental developmental anomalies. Both permanent and primary dentition exhibits these defects, with permanent teeth being more often impacted. While it was seen to be significantly low in the primary dentition, the total occurrence of these abnormalities is estimated to be between 1% and 10% in the permanent dentition. Dental anomalies, resulting from genetic and environmental factors during the

morphodifferentiation stage of odontogenesis, lead to changes in the number, size, and roots of teeth. Understanding the prevalence and extent of these anomalies offers valuable insights for phylogenetic and genetic studies. Additionally, this knowledge aids in comprehending the variations among different populations and between various population groups (Kashmoola et al., 2021; Vahid-Dastjerdi et al., 2010; Jain et al., 2021).

Early detection of developmental dental disorders is crucial because these conditions have been linked to malocclusion and aesthetic issues and are risk factors for other oral health conditions like periodontal disease and caries (Nemati et al., 2013; Jain et al., 2021). The majority of these abnormalities have no effect on the dentists' regular dental operations, which is one of the main reasons they are not disclosing these illnesses. This lack of disclosure often leads to patients remaining unaware of their conditions until they progress, complicating treatment options. Additionally, early identification and management can prevent long-term complications and improve overall oral health outcomes. Enhanced training and awareness among dental professionals are essential to bridge this gap in early detection and patient education. Less common anomalies included lip pits (3 cases), fusion (2 cases), retained deciduous teeth (2 cases), and single instances of angular cheilitis, cleft lip and palate, talon cusp, and amelogenesis imperfecta. Among different age groups, dental anomalies were most prevalent in children aged 6-12 years, followed by those aged 13-15 years, and least common in children aged 3-5 years. The chi-square test showed a statistically significant result (P = 0.003) (Bandaru et al., 2019).

An analogous study conducted in Jazan, Saudi Arabia, found that the prevalence of developmental dental disorders was nearly 38% overall, with the majority of the disorders related to transposition, ectopic eruption, rotated teeth, supernumerary teeth, and macro- and microdontia (Vani et al., 2016). According to different research conducted in Jeddah, 46% of patients who visited King Abdulaziz University Hospital had dental abnormalities; the most prevalent ones were impactions, dilatation, and congenitally absent teeth. The study revealed that 396 patients exhibited at least one dental anomaly. Among these, congenitally missing teeth were observed in 226 cases, impacted teeth in 186 cases, dilacerated teeth in 10 cases, supernumerary teeth in 3 cases, odontoma in 1 case, and taurodontism in 1 case out of all the radiographs reviewed. Conclusions: Congenitally missing teeth emerged as the most common anomaly, followed by impacted teeth, while root dilacerations, supernumerary teeth, and taurodontism were the least common anomalies (Afify & Zawawi, 2012).

OPGs were used in research conducted in the Eastern Province to ascertain the incidence of dental diseases among patients attending a dental facility. According to their results, the bulk of these abnormalities were detected in the female subjects, with an overall frequency of around 36%. In terms of disease categories, the most often reported abnormalities were congenitally missing teeth and dilacerations (ALHumaid et al., 2021). According to another study, 6.1% of the population in Al Jouf Province had hypodontia (Sajjad et al., 2016). Approximately 21% of the research group in a different study conducted in Taif, Saudi Arabia, had at least one kind of developmental dental abnormality. Aljuaid et al. (2022) reported that 8% of the individuals had several anomalies. It was found that a total of 512 people (20.63%) had developmental abnormalities, and 386 people (15.56%) had at least one dental developmental abnormality. The frequency and distribution of shape and size anomalies, number and location are 46.8%, 26.9% and 42.9%, respectively. In the present studio, 15.56% of subjects have fewer anomalies, 8.54% of subjects have more anomalies and 79.36% have no desire anomalies. In comparison, the results are observed in a statistically significant manner between different groups of anomalies (Aljuaid et al. 2022).

Dental malformations and common congenital abnormalities may appear on their own or as part of a syndrome (Remizova et al., 2021; Alamri et al., 2019; Alhamwi et al., 2020). Morphological abnormalities resulting from improper development may affect both permanent and deciduous teeth. Taurodontism, peg-shaped laterals, enamel pearls, dens evaginate (DE), fusion,

concrescence, and dilaceration are only a few of the numerous variations in these abnormalities. All of these abnormalities have clinical significance in terms of appearance, malocclusion, and the necessary setting for the emergence of dental decay and other oral diseases. Developmental anomalies of the teeth necessitate thorough examination and meticulous treatment planning. The presence of one anomaly often suggests the likelihood of additional anomalies. These dental anomalies exhibit significant variations, with no two anomalies of the same type being identical. (Jahanimoghadam et al., 2016; Hall et al., 2014).

Dental abnormalities affect the gingiva and teeth and may be either congenital, developmental, or acquired. Congenital abnormalities are those that appear at birth and have a genetic basis; developmental errors occur during the process of tooth development; acquired malformations occur after teeth have fully grown (Hall et al., 2014; Nicholls et al., 2016). Environmental and genetic factors have been connected to the development of dental defects. In dentistry, developmental abnormalities may be anything from isolated problems to clues to more complex illnesses (Marques et al., 2015). A wide variety of variations in tooth number, morphology, size, and eruption timing are considered dental abnormalities. These abnormalities may cause malocclusion, increased sensitivity, and cosmetic problems, in addition to making dental procedures like root canal treatment and tooth extractions more difficult. Dental anomalies were observed in 213 cases, with a higher occurrence in females compared to males. However, this difference was not statistically significant. (Hall et al., 2014; Saberi et al., 2016).

Numerous anomalies in dentition are often seen in dental clinics. Though they may provide difficulties in treatment planning, these anomalies only contribute to a relatively tiny percentage of oral illnesses in comparison to more prevalent ones, such as periodontal diseases and dental caries. These include malocclusion, the potential for acquiring further oral diseases, and problems with function and appearance. They thus often need sophisticated treatment (Gupta et al., 2011; Carrillo et al., 2014). A Saudi Arabian study conducted in Jeddah found that 396 people (or 45.1%) had at least one dental anomaly. Out of all the radiographs that were examined, 226 (or 25.7%) had congenitally missing teeth; 186 (21.1%) had impacted teeth; 10 (1.1%) had dimpled teeth; 3 (0.3%) had supernumerary teeth; 1 (0.1%) had odontoma; and 1 (0.1%) had taurodontism (Afify et al., 2012). 350 of the 20,182 individuals who underwent testing in a related study carried out in India exhibited dental abnormalities. (Afify et al., 2012; Guttal et al., 2010).

Different tooth numbers, shapes, and structures, along with differences in how they erupt and exfoliate, may all be signs of various dental abnormalities. Inconsistencies in the eruption and exfoliation patterns of growing teeth lead to dental deformities. This takes place during the morph differentiation developmental stage. When planning orthodontic and dental treatment, it is essential to take into account any possible dental abnormalities that the patient may have (Gupta et al., 2011). Several research endeavors have tried to ascertain the frequency of dental abnormalities within certain groups. The prevalence estimates for dental abnormalities have ranged from 5.46% to 74.7% in various studies and groups, according to Khan et al. (2015) In past study done by Khan et al. (2015), a portion of patients exhibited some form of dental anomaly. Hypodontia was the most common, with the maxillary lateral incisor being the most frequently missing tooth. Most dental anomalies were more prevalent in female patients, except for double tooth (gemination) and transposition, which were more common in male patients. Careful observation and appropriate investigations are necessary to diagnose various dental anomalies and initiate correct treatment at the right time to reduce any complications.. The inequalities might be attributed to ethnic disparities, diagnostic criteria, or sample methodologies. Many of these studies only provide findings for certain subgroups or classifications of dental abnormalities. Racial differences, diagnostic criteria, and sample techniques might all be blamed for the variances. Many of these studies only provide findings for certain subgroups or classifications of dental abnormalities (Baron et al., 2018). 252 individuals (45.74%) out of the 551 patients in the research who had orthodontic treatment at a French hospital between 2003 and

2013 had at least one dental abnormality. Ectopic eruption (11.43%) was the most frequent abnormality, followed by taurodontism (15.06%). Early tooth eruption, premature exfoliation, fusion, gemination, talon cusp, dentinogenesis imperfecta, and regional odontodysplasia were not seen in any of the cases. It was found that there seemed to be no correlation between gender and the prevalence of dental abnormalities (Grahnen et al., 1959; Elfrink et al., 2015).

An ectopic protrusion of the canines towards the palate affects around 1.5% of individuals. Not only does this dental anomaly hinder the canines' normal eruption, but it may also have adverse orthodontic repercussions, such as the possibility of neighboring teeth's roots resorbing. Heredity is believed to have a significant role in the formation of palatally displaced canines (Sogra et al. 2012). Dental defects often occur in clusters, yet several patients may have multiple occurrences. Hypodontia is the most frequent developmental dental anomaly among Iranian orthodontic patients, with ectopic eruption being the next most common. [Sogra et al., 2012].

In a sample of individuals aged seven to fourteen who were not undergoing orthodontic treatment, significant reciprocal connections were discovered between five of the seven kinds of dental abnormalities investigated, suggesting a comparable genetic origin. Palatally misplaced canines were seen in 34% of individuals with conical upper lateral incisors. In this Iranian population, irregularities in tooth alignment were the most frequently observed dental anomalies, while anomalies in tooth structure were the least common. The prevalence and types of dental anomalies differ among populations, suggesting that racial factors play a role in their occurrence. [Shokri et al., 2014]. In 32 Japanese orthodontic patients, the authors showed a relationship between agenesis of the maxillary first molars and an increased prevalence of various permanent tooth agenesis types. Researchers found that the frequency of permanent tooth agenesis was 13 times greater in individuals without third molars than in those with them [Gasparro et al., 2022].

Justification for the Study:

In some individuals, developmental dental diseases may impede the dentition's normal growth and lead to additional dental issues such as periodontal disease and caries. In order to better dental therapy and prevention, it is crucial to ascertain the prevalence of these illnesses.

Aim of Study:

The purpose of the study is to determine the prevalence of developmental dental disorders among the patients visiting REU clinics.

- Listing the frequent anomalies in the study sample is the initial objective.

• To evaluate the prevalence of developmental disorders across genders, nationalities and medical conditions.

Materials and Methods:

This retrospective study employed patient data from the Dentoplus system. Every patient file was evaluated using bitewings, history, charting, and OPGs; any irregularities discovered were documented. Through simple sampling, we were able to get data from the patient file database. The REU review board granted ethics clearance before patient files were accessed.

Inclusion criteria:

- Patients of all ages
- Patients with no dental trauma

- Patients with no medical history
- Patients with complete records

Exclusion criteria:

- Patients with cleft lip and palate,
- Patients with fewer than 28 teeth, and
- Patients using orthodontic brackets
- Patients with trauma history
- Patients with medical history
- Patients with low quality radiographs
- Patients with crown/bridge

Sample size:

Error margin	5%
Level of confidence	95%
size of population	4000
Suggested number of samples	353

Despite the 357-person sample size guideline, we supplemented our findings, as far as possible, with extra data from the patient database.

Statistical analysis: Following collection, the data were imported into SPSS version 23 from an Excel spreadsheet and subjected to both descriptive and inferential analysis. We used frequencies, mean values, and chi-square tests to achieve our study objectives.

Results:

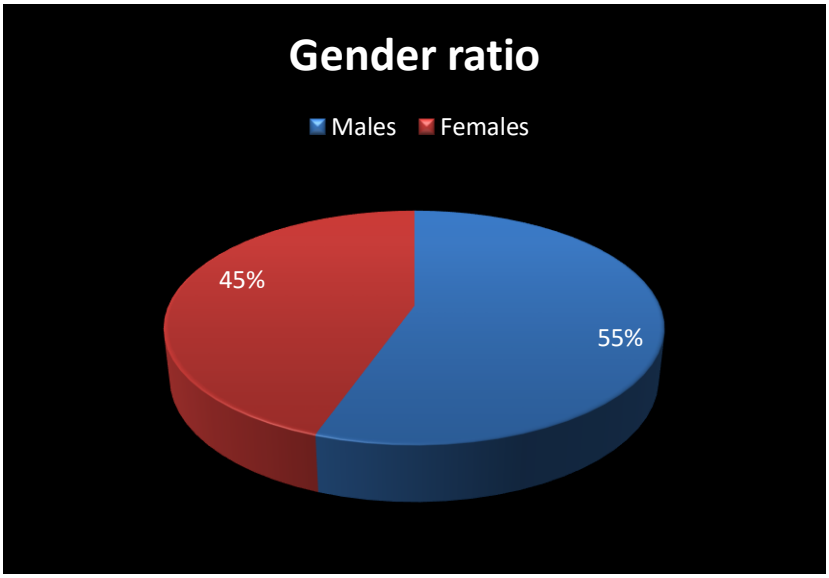

Table 1: Gender ratio of the study participants

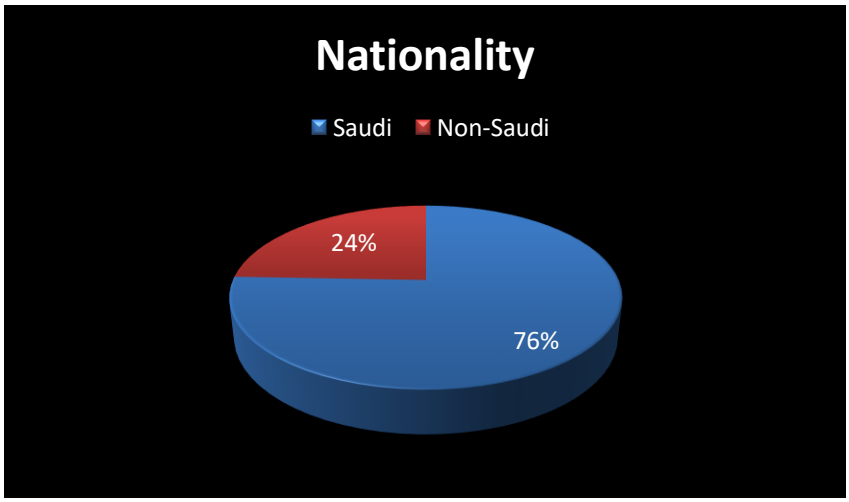

Figure 2: Nationalities of the study participants

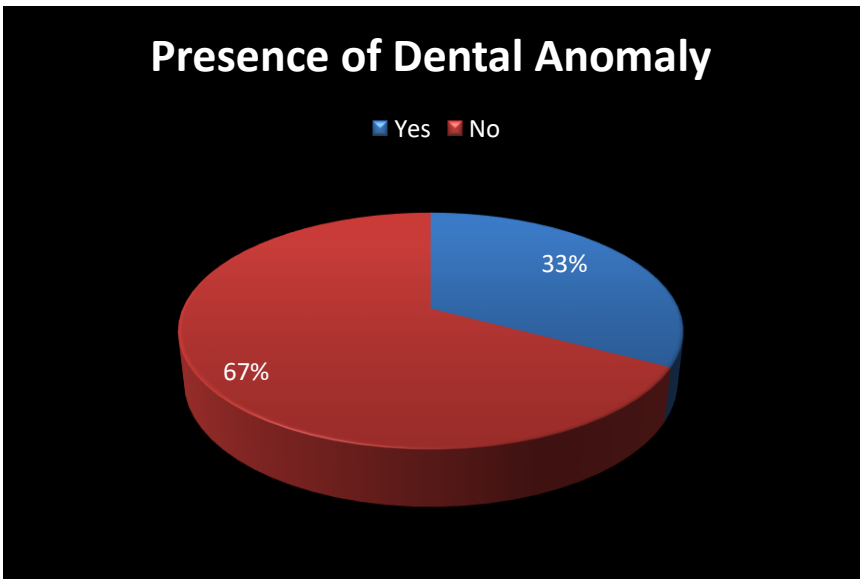

Figure 3: Presence of dental anomaly among the study participants

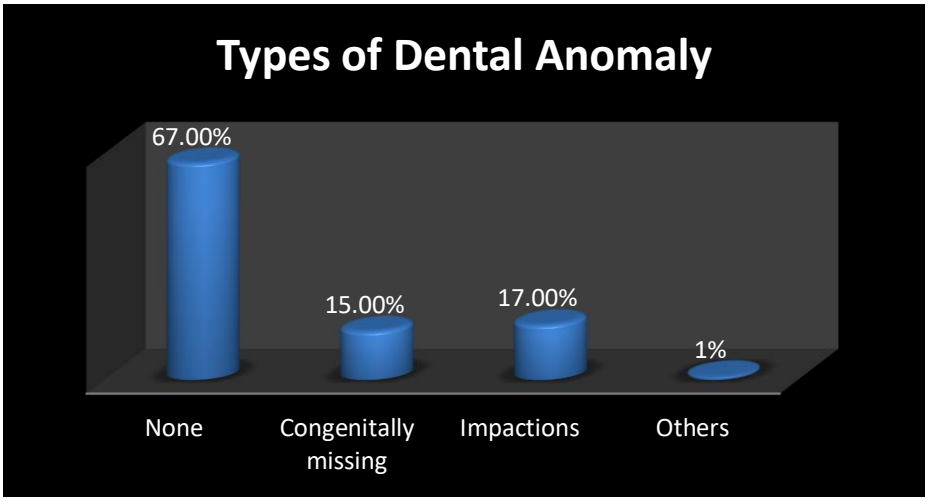

Figure 4: Types of dental anomalies among the study participants

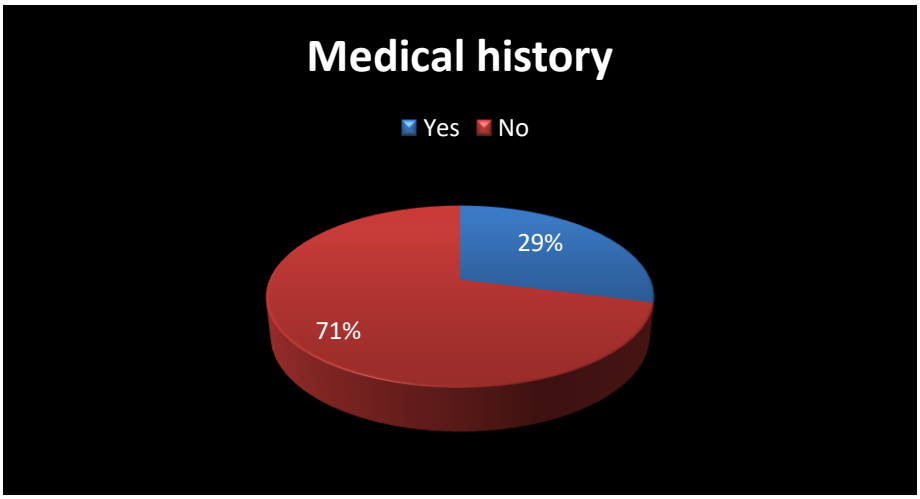

Figure 5: Presence of medical history among the participants

Table 1: Prevalence according to genders

Variables	Gender	p-value
Presence of dental anomaly	**Males: 30% Females: 35%**	**.329**
Type of dental anomaly (congenitally missing):	**Males 15.5% Females: 15.29%**	**.789**
Type of dental anomaly (Impactions):	**Males: 31.1% Females: 36.4%**	**.738**

Table 1 shows the frequency of dental abnormalities in boys and girls, with particular emphasis on the presence of impactions, congenitally missing teeth, and dental deformities. The information is shown as percentages for each gender, and the p-values show whether the prevalence rates for men and women vary statistically significantly.

Overall, the findings revealed that the frequency of dental abnormalities in boys and girls did not vary statistically significantly. The prevalence of dental anomalies was found to be 30% in men and 35% in females. A p-value of .329 suggested that there was no statistically significant difference in this category.

Similarly, there were no significant differences between males and females for certain kinds of dental malformations, such as impactions and congenitally missing teeth. With a p-value of.789, the frequency of congenitally missing teeth was 15.5% in males and 15.29% in females. With a p-value of.738, the prevalence of impactions was found to be 31.1% in males and 36.4% in females.

Table 2: Prevalence according to nationality

Variables	Nationality	p-value
Presence of dental anomaly	**Saudi: 33.5% Non-Saudi: 30.5%**	**.617**
Type of dental anomaly (congenitally missing):	**Saudi: 15.7% Non-Saudi: 14.2%**	**.777**
Type of dental anomaly (Impactions):	**Saudi: 34.3% Non-Saudi: 30.7%**	**.591**

Table 2 presents the prevalence of different types of dental anomalies among Saudi and non-Saudi individuals, along with the p-values indicating the significance of any differences between the two groups.

Our study found that 33.5% of Saudis and 30.5% of non-Saudis had some form of dental anomaly. However, the difference in prevalence between the two groups was not statistically significant (p = .617), suggesting that nationality does not seem to be a factor in the overall presence of dental anomalies.

The prevalence of congenitally missing teeth was 15.7% among Saudis and 14.2% among non-Saudis. Again, there was no statistically significant difference between the two groups (p = .777), indicating that the nationality of an individual does not appear to influence the likelihood of having congenitally missing teeth.

The prevalence of dental impactions was 34.3% among Saudis and 30.7% among non-Saudis. Similar to the other findings, the difference was not statistically significant (p = .591).

Table 3: Prevalence according to medical history

Variables	Medical history	p-value
Presence of dental anomaly	**Yes: 38% No: 30.6%**	**.191**
Type of dental anomaly (congenitally missing):	**Yes: 18.3% No: 14.2%**	**.834**
Type of dental anomaly (Impactions):	**Yes: 34.8% No: 32.9%**	**.806**

Table 3 presents the prevalence of dental anomalies among individuals based on their medical history. The variables studied include the presence of dental anomalies, specifically congenitally missing teeth and impactions.

For the presence of any dental anomaly, the study found that 38% of individuals with a medical history had a dental anomaly, compared to 30.6% of those without a medical history. However, the difference was not statistically significant (p = .191), indicating that medical history may not be a significant factor in the presence of dental anomalies.

Regarding the type of dental anomaly, the study looked at two specific types: congenitally missing teeth and impactions. For congenitally missing teeth, 18.3% of individuals with a medical history had this anomaly, compared to 14.2% of those without a medical history. Again, the

difference was not statistically significant (p = .834), suggesting that medical history does not play a significant role in the prevalence of congenitally missing teeth.

Similarly, for impactions, the study found that 34.8% of individuals with a medical history had impactions, compared to 32.9% of those without a medical history. The difference was not statistically significant (p = .806).

Discussion:

One important aspect of dental disease is developmental dental abnormalities. Prior research indicated that 36.71–40.31% of study participants had at least one dental defect, demonstrating the prevalence of abnormalities. Patil and colleagues (2013) and Uslu et al. (2009). This is close to what we found in our study. The primary objectives of this study were to determine the frequency of dental anomalies and to analyze participant data on gender, ethnicity and systemic conditions.

This study looks at the prevalence of dental abnormalities in males and females, focusing on impactions, dental deformities, and congenitally missing teeth. The data is collected as p-values, which indicate if there is a statistically significant difference between the prevalence rates for men and women, as well as the percentages for each gender. This study found no statistically significant difference in the prevalence of dental abnormalities between males and girls. It was discovered that 35.1% of women and 30.1% of men had dental abnormalities. With a p-value of.329, it was indicated that this divergence did not vary statistically significantly.

Similarly, when it came to other types of dental abnormalities, including impactions and congenitally missing teeth, there were no appreciable variations between males and females. The prevalence of congenitally missing teeth was 15.51% in men and 15.28% in women, with a p-value of .789. Impactions were found to be prevalent in 31.11% of males and 36.41% of women, with a p-value of .738.

The results of the earlier investigation show that gender variance is minimal. The kind of anomaly, which indicates that 51.21% of cases are male and 48.9% are female and does not take illness into account, is the other most important contrast. Conversely, different categories, such as congenitally absent, were seen among 12.51% of males and 12% of females. Another kind of anomaly is the impactions, which have a male-to-female ratio of 28.81% to 30.8%. These findings were different from the results revealed by Syed et al. (2013), who reported that the impactions were seen more commonly among females, and the overall prevalence of impacted teeth was 33%, which is considerably higher than our study Dental anomalies were observed in 213 cases, with a higher occurrence in females compared to males. However, this difference was not statistically significant. (Saberi et al., 2016).

The prevalence of congenitally missing teeth was found to be 15.71% among Saudis and 14.21% among non-Saudis. Again, the value of p =0.777 suggests that there was no significant difference in terms of statistics between the two groups. This shows that the likelihood of having congenitally missing teeth seems to be unaffected by a person's nationality. When compared these findings with another study in Saudi Arabia, it was found that the overall pravelence of congenitally missing teeth was 32% (Shafi et al., 2018), which is significantly higher than our study More girls than boys were found to have congenitally missing premolars, with the mandibular second premolar being the most commonly missing tooth, followed by the maxillary second premolar. It is important to carefully observe and conduct appropriate investigations to diagnose this condition accurately for proper treatment. Therefore, early detection and treatment of congenitally missing premolars can help reduce complications associated with the absence of these teeth (Shafi et al., 2018).

According to an earlier study, there are no appreciable differences between the various ethnic groups. Of the participants, certain abnormalities affect 51% of non-Saudi participants and 49% of Saudi participants. Based on the kind of abnormality, the second most important comparison reveals that 49.31% of Saudi nationals and 54.41% of non-Saudis had abnormalities for which a condition is irrelevant. Based on a comparison of the two groups' nationalities, the findings indicate that the most prevalent dental abnormalities in Saudi Arabia are taurodontism, odontoma, and ectopic eruption, with rates of 0.61%, 0.51%, and 1.321%, respectively. On the other hand, odontoma, taurodontism, and ectopic eruption do not manifest in non-Saudis. In Iranian permanent dentition, the occurrence of congenitally missing teeth (CMT) was found to be 10.9%. The most frequently missing teeth were the mandibular second premolars, followed by the maxillary second premolars. (Sheikhi et al., 2012).

In our study, the prevalence of congenitally missing permanent teeth was 17%; however, the incidence was much higher in female patients (58.9%). These findings are consistent with previous research In Iranian permanent dentition, the occurrence of congenitally missing teeth (CMT) was found to be 10.9%. The most frequently missing teeth were the mandibular second premolars, followed by the maxillary second premolars. (Sheikhi et al., 2012). The most common form of CMT is the absence of a single tooth (47%), followed by the absence of two teeth (40%). The least prevalent forms are the absence of five teeth (0.35%) and six teeth (0.35%). This study aligns with previous research, although the specific percentages differ (Polder et al., 2004; Fekonja, 2005; Endo et al., 2006; Rahardjo, 2006; Sisman et al., 2007; Altug-Atac & Erdem, 2007; Chung et al., 2008; Al-moherat et al., 2009; Peker et al., 2009). According to this study, the prevalence of oligodontia, defined as the absence of six or more teeth according to Shalk Van, is 0.35%, which is similar to the findings of Vahid-Dastjerdi et al. in their study on orthodontic patients in Iran (Vahid-Dastjerdi et al., 2010).

Limitations

1. Sample Size: Because the research was focused on patients who visited REU clinics, the sample size may be different from the whole population. This could restrict how far the results can be applied to other populations.

2. Data Collection: Radiographs and patient records were the study's primary sources of data, and they may not have included all pertinent details on dental abnormalities. We did not take into account variables like symptoms described by the patient or a family history of dental abnormalities.

3. Selection bias: Selection bias might have been introduced into the research due to the easy sampling method used, as particular patients may have been included in the trial more often depending on their availability or desire to participate.

Prospective Suggestions:

1. Expanded Sample: The generalizability of the results might be enhanced by the inclusion of a bigger and more varied sample of patients from various parts of Saudi Arabia.

2. Inclusion of Other variables: Future research may examine how lifestyle, environmental, and genetic variables contribute to the development of dental abnormalities. This would assist in determining possible risk factors and safeguards.

Future research may further our knowledge of developmental dental problems and increase dental treatment for those who are impacted by these illnesses by addressing these limitations and putting these suggestions into practice.

CONCLUSION

In conclusion, 33% of people have dental abnormalities. When gender, nationality, and medical history were examined, no substantial difference was found. There are notable disparities in the occurrence of dental malformations among Saudi patients according to gender, nationality, or medical history. This implies that the development of dental abnormalities may be more significantly influenced by causes other than these. To improve dental care and preventative actions, it is important to comprehend the occurrence and distribution of these abnormalities.

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