Quest Journals
Journal of Medical and Dental Science Research
Volume 8~ Issue 11 (2021) pp: 29-33
ISSN(Online) : 2394-076X ISSN (Print):2394-0751
www.questjournals.org

Research Paper

Dental Abnormalities in Gharyana Population in Libya

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ABSTRACT
The goal of this study was to investigate the occurrence and distribution of hyperdontia, hypodontia (which includes mesiodens and fused teeth), talon cusps, microdontia (which includes peg-shaped lateral incisors), and macrodontia in patients attending private dental clinics in Gharyan, Libya. During ordinary patient examinations, the inquiry was undertaken clinically and radiographically. A total of 1219 participants were included in the study (358 males and 861 females). 57 of patients had dental anomalies in the percentage of (4.67%), 21 patients (1.72%) had missing teeth, 15 of them had one missing permanent tooth and 6 patients had two missing permanent teeth (the lower 2nd premolar was the most tooth loss 0.49%). In addition, the study showed that 16 patients had supernumerary teeth, 10 patients had microdontia and 7 patients had macrodontia, whereas, two patients had talon cusp. Early detection of a treatable abnormality is critical in developing a thorough treatment strategy for the patient. Some of the unpleasant impact should be avoidable. In some circumstances; functional, cosmetic, and occlusal discord can be detected early enough to warrant interpret of sessional consultation and treatment.

KEYWORDS: *dental anomalies; hypodontia; microdontia; macrodontia.*

Received 01 November, 2021; Revised: 12 November, 2021; Accepted 14 November, 2021

I. INTRODUCTION

Oral developmental abnormalities can be detected in both the teeth and the soft tissue. Dental developmental abnormalities develop due to disturbances in the ontogenesis process by the action of certain disruptive agents. The disruptive agents can be genetic, environmental agents, or even combinations of these agents. Both the teeth and the soft tissue of the mouth can have developmental abnormalities.

The impact of certain disruptive agents disrupts the ontogenesis process, resulting in dental developmental abnormalities. Genetic agents, environmental variables, or a mix of these agents can be disruptive. Dental developmental abnormalities can be abnormalities of number, size, shape, structure, or color. (1) Abnormalities in the number, size, shape, structure, or color of teeth are all examples of dental developmental abnormalities.

There is a scarcity of data on various populations in general, and Arabs in particular. Case studies of congenital dental malformations such as missing teeth, fused teeth, talon cusps, supernumerary and other congenital dental malformations make up the majority of the data. However, other papers are large-scale investigations of various childhood anomalies 1-6. The majority of these researches concentrated on Caucasians and Mongols. hypodontia, supernumerary teeth, peg lateral incisors, fused teeth, and are the most common abnormalities in children (1, 2). Hypodontia is a condition in which one or more teeth are absent from birth. The permanent dentition has been found to have a higher prevalence rate, ranging from 0.03 to 10.1 percent.is (3, 4).

The presence of more teeth than the normal set is defined as supernumerary teeth (5, 6), with prevalence rates ranging from 0.07 to 1.7 percent in the primary dentition (7, 8) and 0.1 to 3.8 percent in the permanent dentition (7, 9). Microdontia is characterized by a considerable reduction in crown width in peg-shaped teeth, with the incisal mesiodistal width of the crown being smaller than the cervical width. The incidence ranges from 0.7 percent to 9.9 percent (10, 11).

The Purpose of this study was to determine the prevalence and distribution of some chosen dental abnormalities, namely hypodontia, hyperdontia (including mesiodens and fused teeth), talon cusps, microdontia (including peg-shaped lateral incisors), and macrodontia, which are all dental abnormalities.

II. THE METHODS

Clinical and radiological evaluations were part of the investigation. During the comprehensive clinical examination, a Dental chair, dental mirror, probe, and standard dental light were used. Counting the erupted teeth in the arch revealed the missing teeth that should have emerged and the presence of erupted supernumerary teeth. Microdontia, macrodontia, and talon cusps were distinguished by their forms. The radiographic evaluation included panoramic views of the jaws as well as periapical and occlusal views of the anterior teeth. Only abnormalities occurring anterior to the first permanent molars were evaluated. Anomalies were noted on printed forms, whether they were single or multiple. Cases having a history of trauma or extraction, as well as cases of ectodermal dysplasia and Down's syndrome, were excluded.

The Findings

Among the 1219 patients (861 females and 358 male), 57 individuals (4.67%) showed developmental dental abnormalities **(Figure 1)**. The gender distribution was 40 females (4.65%) and 17 males (4.75%). The distribution and prevalence of the developing dental abnormalities are displayed in **Table 1.**

Table 1. The distribution and prevalence of developmental dental abnormalities in a sample population of 1219 patients (861 females, 358 males).

Dental anomalies	Male (*n*=358) *n* (%)	Female (*n*=861) *n* (%)	Total (*n*=1219) *n* (%)
hypodontia	5 (1.4%)	16 (1.9%)	21 (1.7%)
Supernumerary permanent teeth	6 (1.7%)	11 (1.3%)	17 (1.4%)
microdontia	4 (1.12%)	6 (0.7%)	10 (0.8%)
macrodontia	2 (0.56%)	5 (0.9%)	7 (0.6%)
Talon cusp	-	2 (0.23%)	2 (0.16%)

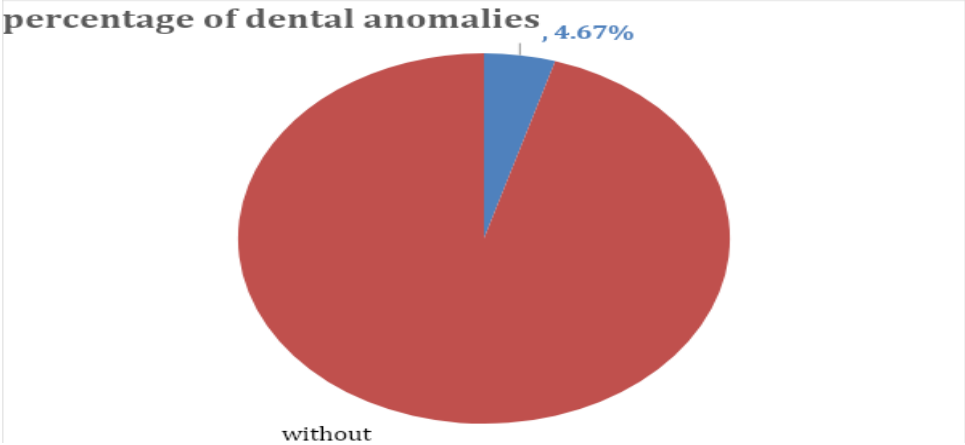

Figure 1: Percentage of patients with dental anomalies

Hypodontia:

It is the first most frequent of all selected dental abnormalities with a prevalence of (1.7%). These abnormalities were established by counting the teeth present clinically and confirming the number by radiographs. Twenty-seven permanent teeth were congenitally missing in 21 patients; mandibular second premolar were the most commonly missing teeth **(Table 2).** One tooth was missing in 71.4% of the patients and two teeth in 28.6%. The pattern of hypodontia and relative frequency of teeth affected are shown in **Table 3**.

Table 2. Location, distribution, and prevalence of hypodontia (congenitally missing teeth) excluding third molars.

Missing teeth	Male (*n*=358)	Female(*n*=861)	Total (*n*=1219)
Mandibular 2nd premolars	2 (0.56%)	4 (0.46%)	6 (0.49%)
Maxillary 1st premolars	-	5 (0.58%)	5 (0.41%)
Maxillary lateral incisors	1 (0.28%)	3 (0.35%)	4 (0.33%)
Maxillary canine	1 (0.28%)	2 (0.23%)	3 (0.25%)
Maxillary second premolars	1 (0.28%)	2 (0.23%)	3 (0.25%)
Total	5 (1.7%)	16 (1.9%)	21 (1.7%)

Table 3. pattern of hypodontia in permanent teeth.

Hypodontia	Relative frequency of teeth*
One missing tooth 15 (71.4%)	45, 14 > 12 > 15, 35
Two missing teeth 6 (28.6%)	13;23 >15;25 , 14;24 , 12;22

*A two-digit system proposed by Federation Denature International of permanent tooth notation:
1) Tooth 45 and 14 are more likely to be absent than 12, which is more likely to be missing than 15 and 35.
2) When two teeth were missing bilateral, upper canines were more frequently missing than upper second premolars, upper first premolars, and upper lateral incisors.

Supernumerary teeth:

It is the second most frequent of all selected dental anomalies with a prevalence of (1.4%). The supernumerary was 17, and you see more in maxilla 16 (94.1%) than in mandible 1 (5.9%). The relative frequencies were mesiodens 8 (47.1%), premolar 4 (23.5%), supernumerary permanent teeth 3 (17.6%), and supernumerary primary teeth 2 (11.8%) **(Figure 2)**. Two patients exhibited supernumeraries of primary teeth, one of which was the upper second molar, and the other patients' bilateral upper lateral incisor and canine.

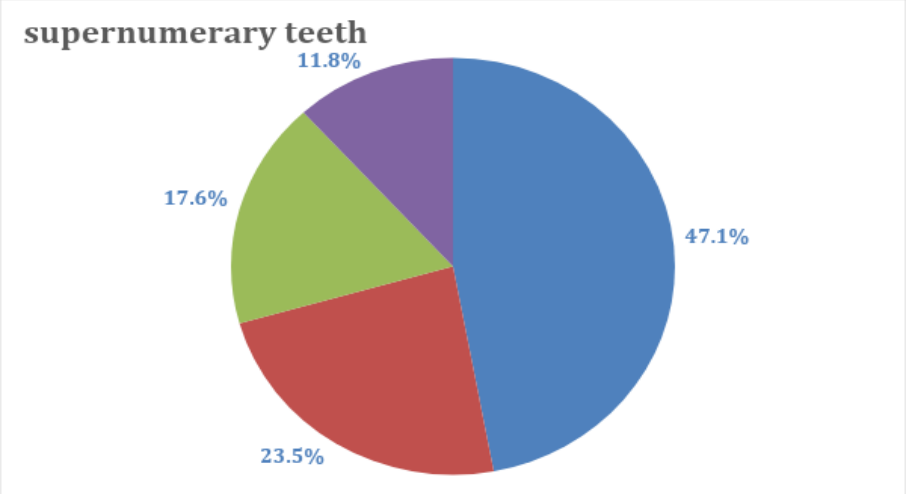

Figure 2: Percentage of patients with supernumerary teeth.

Talon cusps:

Talon cusps were seen in one patient's unilateral upper left lateral incisors and in another patient's bilateral upper lateral incisors in the permanent teeth.

Microdontia:

Microdontia is the third most common of all the selected dental abnormalities with an incidence of 0.8% **(Table 1).** Of 1219 individuals, 6 female and 4 male subjects (total 0.8%) showed unilateral or bilateral peg-shaped teeth. Its bilateral occurrence of 0.88% was higher than the unilateral occurrence of 0.16% **(Table 4)**. Female predominance was also seen in peg-shaped maxillary lateral incisors.

Table 4: The distribution and prevalence of peg shaped in maxillary lateral incisors.

	Unilateral *n* (%)	Bilateral *n* (%)	Total *n* (%)
Male (358)	1 (0.28)	3 (0.48)	4 (1.12)
Female (861)	1 (0.12)	5 (0.58)	6 (0.7)
Total (1219)	2 (0.16)	8 (0.66)	10 (0.8)

Macrodontia

It is the fourth most common of all selected dental abnormalities with an incidence of 0.6% **(Table 1)**. Seven patients had macrodontia in all tooth structures.

III. DISCUSSION

During a routine dental examination, dental anomalies are frequently discovered. The present study examines the prevalence of developmental dental anomalies in 1219 patients treated at a dental clinic in Gharyan, Libya, between 2018 and 2020.

4.69% of the people in this study had at least one dental abnormality.

The disparities in the prevalence of dental anomalies were identified between the different epidemiological researches (13-16, 12). The main reasons for the discrepancies are racial variations and sample procedures.

These differences could be due to a variety of causes, including differences in demographic groups, gender differences, and body size. However, the association of genetic, epigenetic, and environmental variables could influence all differences. This association may have a direct or indirect effect on teeth growth (18).

The prevalence of hypodontia was 1.72 percent in this study, with 76.19 percent of the participants being female. Distinct ethnic groups have different types of missing teeth. The most frequently missing loss teeth in American children are the upper lateral incisors (19), The lower second premolars are the most commonly missing teeth in European children (20-22). This agrees with the findings of the current study, which show that the lower second premolars are the commonly missing teeth; the lower second premolars are the most commonly missing teeth representing 28.57 percent of all missing permanent teeth, followed by the upper first premolars. for 28.57 percent of all missing permanent teeth, followed by the upper first premolars. Females had 12 times more missing permanent teeth than males, according to Castaldi (17). Females account for 76.19 percent in a 16 to 5 ratio, according to the current findings.

In the permanent dentition, supernumerary teeth are more common in the anterior area as mesiodens than in any region of either dental arch (23, 24). Supernumerary teeth are the second most abundant anomaly in our study, accounting for 1.4 percent of the participants. The phase of tooth morphogenesis in the development phases determines whether a tooth is present or not, as well as its size and shape (25).

The incidence of supernumerary teeth was studied by Zhu et al (26) and found that the prevalence in the white population ranged from 1% to 3%, while the general proportion in the Turkish population (27) was 0.36 percent.

We detected supernumerary teeth in 1.4 % in my study. According to other researches, the maxilla accounts for 90 percent to 98 percent of all supernumerary teeth, with the premaxilla region being the most prevalent location (27, 28). Many studies have established that mesiodens is the most prevalent type of hyperdontia; we discovered that mesiodens is the most prevalent forms of hyperdontia in this study as well, followed by maxillary paramolars, even though they are the second most common supernumeraries (26).

Microdontia is a condition that makes one or more teeth to be much smaller than they should be. The incidence of microdontia in healthy people is unknown, and the standards used to assess it differ. Uslu et al. discovered microdontia in 0.7 percent of the overall study sample and only in female participants (13), whereas Gamze Aren et al. discovered microdontia and peg-shaped maxillary lateral incisors in 0.54 percent of the overall study group (29). As a result, it is the second most prevalent dental abnormality. Microdontia is the third most prevalent dental abnormality in our study, with a prevalence of (0.8%). Female predominance was also seen in peg-shaped maxillary lateral incisors.

Macrodontia Is a rare dental abnormality accompanied by an extreme development of most tooth components, which has been related to a variety of diseases. Dental abnormalities, such as macrodontia, are caused by complex multifactorial interactions involving genetic, epigenetic, and environmental effects over the course of tooth development (25). According to Kondo and Townsend (30), they also indicate that the heredity and environmental factors that influence tooth form are more important than other aspects. Nevertheless, they also claim that these variations are particularly noticeable during the crown growth stage that is in line with the findings of Book (25). Nine of the participants among this work had macrodontia.

Talon cusp is a rare dental abnormality that mostly affects the maxillary permanent incisor. The permanent lower incisor, (31, 32), permanent upper canine, (15, 34), primary upper incisors, (32-35), and primary upper canine (15) were all reported to be affected. When the extension from the cingulum area is asymmetrical, as in one of the cases in this series, the tooth resembles a fused tooth or supernumerary. It is easy to confuse this with mesiodens when it happens in the maxillary midline (36).

Talon cusp affects 1% to 8% of people, and the anomaly is more prevalent in the upper jaw, with the maxillary lateral incisor in the permanent dentition being the most commonly impacted (37). Through the current analysis, the maxillary central incisor was the most often affected tooth, accounting for 0.16 percent of the participants.

IV. CONCLUSIONS AND SUGGESTIONS:

Finally, the findings of this investigation revealed that 4.67 percent of the individuals had congenital dental abnormalities. Missing teeth were the most common aberration, which occurred more frequently in females, with the lower second premolars being the most commonly missing. Early detection of a treatable aberration is critical in developing a thorough treatment strategy for the patient.

However, because their impacts might begin with the eruption of one or both primary and permanent teeth and last for the rest of one's life, some of the negative consequences should be avoided. Future research is required to correlate the developmental anomalies with dental and/or oral diseases.

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