FREQUENCY OF THE PHENOMENON "HYPERDONTIA" IN LATERAL MAXILLARY AND MANDIBULAR AREAS

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Abstract: Supernumerary teeth are more common in the permanent dentition than in the primary dentition, may be single or multiple, unilaterally or bilaterally placed, erupted or impacted, in the upper or lower dental arch. They may be morphologically normal or abnormal in structure and characteristic. According to the specialized literature, the incidence of hyperdontia ranges between 0.1% and 6%. The majority of authors report an incidence of 0.76% to 1.84% for european population representatives. The reported incidence for Bulgaria is 1.1% in a study conducted in 2020 and 3.1% in a study conducted in 2023.
The aim of our study was to investigate the appearance and incidence of hyperdontia in the distal (lateral) maxilla and mandible regions. To accomplish it, we analyzed the records of 2676 orthodontic patients, 1705 (63.7%) female and 971 (36.3%) male.
When we evaluated the data, we found true hyperdontia in 84 patients (53 males and 31 females), representing 3.13%. The premolar group ranked third in frequency after mesiodens and incisors, totaling 19.1% of all patients with hyperdontia. The prevalence of hyperdontia in premolars in the mandible was 13.1%, while in the maxilla it was 6.0%. The molar area was the least affected by hyperdontia: mandibular, 5.0%, and maxillary, only 1.2%.The present study aims to examine the clinical manifestation and frequency of hyperdontia in the distal (lateral) maxillary and mandibular regions.
In the case of problems in the frontal segment in the presence of supernumerary teeth, the issues are detected in a relatively timely manner, as they manifest themselves as early as the eruption of the incisor tooth group. Frontal segment disorders are also associated with aesthetic changes, which is the reason patients seek orthodontic treatment early. When the lateral segments are affected, the symptomatology manifests relatively late or is detected incidentally at radiographic diagnosis - in the period of late mixed and formed permanent dentition. In premolar hyperdontia, the multiple form is often seen and may affect both jaws simultaneously, but the tendency in multiple hyperdontia is to find the majority of the supernumerary teeth in the mandibular premolar region.
The time of detection of hyperdontia is variable according to the age range of the patients studied and the tooth groups involved, but is within the first two decades of life. Early detection of the problem increases the success rate of treatment.
Keywords: Hyperdontia; Frequency; Premolars; Mandible; Maxilla.

1. INTRODUCTION

Supernumerary teeth, which we call by the term hyperdontia, develop in addition to the normal set of teeth in a dentition. They are more common in the permanent dentition than in the primary dentition, may be single or multiple, unilaterally or bilaterally located, erupted or impacted, in the upper or lower dental arch. They may be morphologically normal or abnormal in structure and characteristic. The exact etiology of supernumerary has not yet been fully established, but dental germ dichotomy, dental lamina hyperactivity, or a disturbance in the signaling pathways responsible for the number and formation of dental germs are among the most common theories. This anomaly is etiologically heterogeneous and with many variable parameters. According to specialized literature, the frequency of hyperdontia ranges between 0.1% and 6% (Harris & Clark, 2008). The majority of authors report an incidence of 0.76% to 1.84% for members of the European race (Cholakova, 2020; Bereket, Çakır-Özkan, Şener, Bulut and Baştan, 2015; Berrocal, Morales and González, 2007; Brinkmann, Martínez-Rodríguez, Martín-Ares, Sanz-Alonso& Marino, 2020; Celikoglu, Kamak and Oktay, 2020: Ledesma-Montes, Garcés-Ortíz, Salcido-García and Hernández-Flores, 2016). The established prevalence for Bulgaria is 1.1% in a study conducted in 2020 (Cholakova, 2020) and 3.1% in a study conducted in 2023 (Grancharov, 2023). Based on the articles analyzed, it was found that the most common supernumeraries were those with a conical shape in the frontal region. Male gender representatives are more often affected by supernumerary teeth than females. Different subtypes of supernumerary teeth have different frequency of occurrence. In males, mesiodens and supernumerary premolars are more common, while females have a greater number of extra incisors and canines (Eshgian, Al-Talib, Nelson & Abubakr, 2021). In cases involving hyperdontia, there is a disturbance in aesthetics and function, and patients may complain of impaired quality of life. Disturbances of tooth position in the individual dental arch and occlusal relationships are the most common orthodontic problems in these patients. More severe from the orthodontic point

of view are the cases in which supernumerary teeth are combined with their retention or that of their adjacent teeth. In most clinical cases, extraction of the supernumerary teeth and subsequent orthodontic treatment is performed. In patients with multiple supernumerary teeth present, their surgical removal is prescribed, usually combined with orthodontic treatment associated with teeth leveling in the dental arch or extraction of retinated adjacent teeth.

The aim of our study was to investigate the appearance and incidence of hyperdontia in the distal (lateral) regions of maxilla and mandible.

Material and Methods: In order to fulfill the set aim and objectives, a prospective clinical and epidemiological study was conducted, covering patients who were diagnosed and orthodontically treated by the author and his supervisor for a period of 8 years. The records of 2676 orthodontic patients were analyzed, 1705 (63.7%) women and 971 (36.3%) men.

Results: In the analysis of the data, we found hyperdontia in 84 patients (53 males and 31 females), representing a prevalence of 3.13% (Table 1).

Table 1. Gender distribution of the patient contingent and incidence of hyperdontia.

Sex	Total (N)	Hyperdontia (N)	Hyperdontia (%)
Male	971	53	5,5%
Female	1705	31	1,8%
Total	2676	84	3,1%

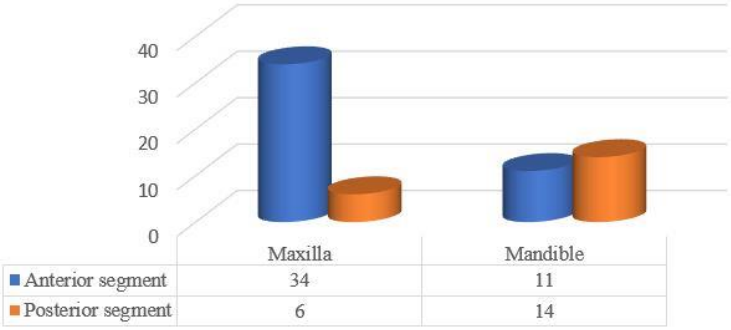
Among the cases of hyperdontia, the premolar group ranked third in frequency after mesiodens and incisors, with a total of 19.1% of all patients with hyperdontia (Table 2).

Table 2. Distribution of hyperdontia by tooth group .

Tooth group	Number of patients	Number of teeth	%
Mesiodens	21	25	29.75
Maxillary central incisor	13	19	16.65
Maxillary lateral incisor	18	22	23.8
Maxillary canine	0	0	0.0
Maxillary premolar	5	6	6.0
Maxillary molar	1	1	1.2
Mandibular incisor	9	10	11.9
Mandibular canine	2	3	2.4
Mandibular premolar	11	18	13.1
Mandibular molar	4	5	5.0
Total	84	109	100%

The distribution of hyperdontia in premolars is 13.1% for mandible, while it is 6.0% for maxilla. The molar area was the least affected by hyperdontia: mandibular 5.0% and maxillary only 1.2% (Chart 1).

Chart 1. Distribution of hyperdontia by segment.



2. DISCUSSION

The data from different authors on the prevalence of hyperdontia by tooth group are presented in Tables 3 and 4. Until recently, it was assumed that mesiodens was the most common supernumerary tooth, but in some studies the molar group tends to occupy the first place, with a frequency between 38.3% and 47.6% (Bereket et al, 2015; Berrocal et al, 2007; Brinkmann et al, 2020; Peker, Kaya and Darendeliler-Yaman, 2009). It is likely that the authors also analyzed hyperdontia associated with wisdom teeth and odontoma, which is characterized by localization in the lower distal segments. It is important to note that Bereket et al (2015) and Brinkmann et al (2020) have conducted some of the most extensive studies on the topic, on 111,293 and 28,114 patients in 2021 and 2020, respectively. However, one cannot help but point out that the occurrence of the anomaly in this tooth group is extremely variable between different authors with values between 0.2% (Gomes, Drummond, Jham, Abdo & Mesquita, 2008) and 47.6% (Brinkmann et al, 2020).

Table 3. Distribution of hyperdontia by dental groups, only in patients with established hyperdontia according to different authors.

Author/Year	Number of patients	Mesiodens	Incisors	Premolars	Molars	Canines
Ferrés-Padró 2008	79	53.16%	18.99%	10.13%	8.86%	5.33%
Gürler 2017	34	42.5%	23.4% (combined percentage for Incisors and Canines)	29.7%	4.4%	-
Montenegro 2006	102	48%	2.05%	24.1%	18%	0.4%
Gomes 2008	305	28.5%	48.3%	8%	0.2%	3.9%
Peker 2009	37	19.2%	0%	35.7%	38.3%	2.7%

Premolars in hyperdontia are also frequently observed compared to other tooth groups, with values between 8% (Gomes et al, 2008) and 37.5% (Peker et al, 2009). They are the second most frequent in all of the reviewed studies (Brinkmann et al 2020; Celikouglu et al, 2020; Gurler, 2017; Ledesma-Montes et al, 2016; Mahabob, Anbuselvan, Kumar, Raja and Kothari, 2018), except those of authors Gomes et al (2008), Ferres-Padro, Prats-Armengol & Ferrés-Amat (2009), Bereket et al (2015), Cholakova (2020) and Berrocal et al (2007).

Table 4. Incidence of hyperdontia by indicator different tooth groups, according to different authors.

Author	Year of the research	Number of patients	Percentage of hyperdontia	% Mesiodens	% Incisors	% Premolars	% Molars	% Canine
Leco Berrocal	2006	2000	1.05%	28.6%	-	23.8%	42.8%	4.8%
Ledesma-Montes	2016	3522	1.5%	40.19%	8.41%	29.91%	9.35%	No data
Celikoglu	2010	3491	1.2%	31.3%	22.9%	25%	18.7%	2.1%
Brinkman	2020	28114	1.84%	19.8%	-	20.1%	47.6%	No data
Cholakova	2020	1000	1,1%	41,5%	7,5%	12,3%	15,1%	No data
C Bereket	2021	111 293	0.76%	33.37%	8.9%	20.18%	35.54 %	4.36%

Supernumerary teeth can be localized in any part of the dental arch, but the most frequently cited area in the literature is the midline of the maxilla (Arandi, Abu-Ali and Mustafa, 2020; Bereket et al, 2015; Peker et al, 2009). Our results identified the maxillary frontal segment as the area with the greatest concentration of supernumerary teeth as well. The distal mandibular regions ranked second, among which supernumerary teeth were found in 14 patients. In the orthodontic contingent of patients that we examined, we found that the anomaly in the distal segments of the maxilla was least frequently observed. In contrast to our study, other authors concluded that it is the distal maxillary segments that are the zone with the highest percentage of supernumerary (Bereket et al, 2015; Berrocal et al, 2007; Brinkmann et al, 2020). Other studies have shown a high prevalence of hyperdontia in the mandibular premolar region (Eshgian et al, 2021; Gomes et al, 2008; Peker et al, 2009). When the frontal segments are affected in the presence of supernumerary teeth, the problems are detected in a relatively timely manner as they are already manifested when the incisor tooth group erupts. Frontal segment disorders are also associated with aesthetic changes, which is the reason patients seek orthodontic treatment early. When the lateral segments are affected, the symptoms manifest relatively late or are detected incidentally on radiographs - during the period of late mixed and permanent dentition formation (Khalaf, Al Shehadat & Murray, 2018). After the surgical extraction of the supernumerary teeth in the distal segments, the changes are quite different from those of extraction in the front because they occur at a more advanced stage of the development of the dentition (Cholakova and Georgiev, 2023).

In hyperdontia involving premolars, multiple forms are often seen and can affect both jaws simultaneously, but the tendency in multiple hyperdontia is to find the majority of supernumerary teeth in the mandibular premolar region (Grancharov, 2023; Khalaf et al, 2018). Supernumerary premolars can be distinguished from normal premolars as most of the times they have a conical shape or if they have a normal shape, their size is reduced (Oehlers, 1952). 75% of premolars in hyperdontia are impacted, and the majority of these are found to be asymptomatic (Breckon and Jones, 1991). They have a marked tendency to form cysts and pathological changes (Bharti V., Bharti C. and Ratre, 2018). The same frequent effect of impaction of the supernumerary tooth and/or also the adjacent teeth is observed when hyperdontia affects the molar segment (Yordanova-Kostova, Emiliyanov and Yanev, 2023). In the scientific literature, there are reports of erupted supernumerary premolars affecting the patient's occlusion (Mahto, Shantanu, Kafle, Agarwal, Bornstein and Dulal, 2018). In this form of hyperdontia, there are cases of late-developing, supernumerary teeth in the premolar region, which are often detected at the end of orthodontic treatment (around 13 years of age). These can prevent the closure of a space in the dental arch or the placement of an implant in the area (Parolia, Kundabala, Dahal, Mohan and Thomas, 2011). In some clinical cases, variations of the morphological shapes of the supernumerary teeth can be observed, such as cases of fusion/germination (Nunes, de Moraes, de Novaes and de Sousa, 2002; Yordanova, Grancharov and Gurgurova, 2021).

3. CONCLUSION

The premolar group was the third most frequently affected by hyperdontia among the patients studied. Supernumerary teeth were found in the distal mandibular zone in 14 of our patients, ranking the zone second in

frequency of occurrence. Detailed knowledge of this problem and its characteristics increases the success rate in its diagnosis and treatment.

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