CLINICAL AND EPIDEMIOLOGICAL STUDY OF SUPERNUMERARY TEETH IN PATIENTS FROM PLOVDIV REGION

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Abstract. Abnormalities in the number of teeth are conditions that occur predominantly in childhood. Therefore, monitoring the prevalence and early diagnosis is very important for the timely and appropriate therapeutic approach. The aim of the study was to investigate the incidence of supernumerary teeth in patients from the city of Plovdiv. **Methods and equipment:** 1,000 dental patients were studied. Data were collected from patients seeking medical attention at the Faculty of Dental Medicine in Plovdiv. We used clinical, X-ray and statistical methods for investigation. **Results:** A 1.1% prevalence of supernumerary teeth (ST) was observed in the studied patients. A statistically significant difference was found between the presence of ST in the permanent and mixed dentition, with a 3% relative proportion of ST in the mixed and 0.62% in the permanent dentition ($p < 0.05$). The relative proportion of ST in the maxilla was 90.9%, and in the mandible – 9.1%. A statistically significant difference ($p < 0.05$) was found in the distribution of ST by jaws. In our study, a higher frequency of mesiodens and distomolar (1.08% and 0.22%, respectively) was found in males, and a decreasing relative proportion from the midline to distally in females (mesiodens – 0.56%, paramolar – 0.19%, distomolar – 0.19%). **Conclusion:** Supernumerary teeth are a relatively rare dental abnormality in the Bulgarian population. Its distribution by sex and morphology corresponds to the prevalence in Caucasians and populations of southern countries.

Key words: supernumerary teeth, frequency, distribution by sex, dentition, mesiodens, paramolar, distomolar, parapremolar

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INTRODUCTION

Supernumerary teeth (ST) or hyperdontia is defined as presence of additional teeth or odontogenic structures formed from the tooth germ in excess of the normal dental formula, i.e. 20 deciduous and 32 permanent teeth, regardless of their location and shape. The term “supplemental teeth” was introduced more than a century ago by Tomes

(1873), and it means teeth with morphology similar to that of teeth of the normal dentition [1].

Abnormalities in the number of teeth are conditions that occur predominantly in childhood. Therefore, early diagnosis is very important for the appropriate therapeutic approach. The higher frequency of diagnosing this abnormality in recent years can be associated with the greater attention paid by pediatricians and dental

practitioners. For a timely therapeutic approach, it is necessary to monitor the prevalence in the population. In a literature study, we found no data on the epidemiology of ST in patients from the city of Plovdiv.

OBJECTIVE

The objective was to carry out a clinical and epidemiological study of supernumerary teeth in patients from the city of Plovdiv. One thousand (1,000) dental patients were studied. Inclusion and exclusion criteria are listed in table 1.

Table 1. Eligibility criteria

Inclusion criteria:	Exclusion criteria:
1. Patients in the age range 4 to 74, in relation to the WHO's definition of old age – 74 years of age [2].	1. Radiographs of inadequate quality
2. Orthopantomography available	2. Incomplete test results
	3. Patient's refusal to participate in the study

METHODS AND EQUIPMENT

Data were collected from patients seeking medical attention at the Faculty of Dental Medicine in Plovdiv. The participants in the study were divided into seven age groups: 4 10; 11 20; 21 30; 31 40; 41 50; 51 60; over 61 years of age.

- Clinical methods:** Each patient was subjected to a clinical examination and a case report card was filled out. Erupted supernumerary teeth were detected and described according to their location in the jaw bone: (1) mesiodens – in the palatal midline; (2) parapremolar – in the premolar region; (3) distomolar – a fourth permanent molar located either directly distal or distolingual to the third molar; (4) paramolar – in the interproximal space buccal or lingual to the upper second and third molars [3]; (5) other – depending on the tooth next to which they were located [4].
- X-ray methods:** An orthopantomography (OPTG) by using Planmeca Promax Classic was performed for each patient, with an exposure time of 10 seconds, 66 kV, 9 mA for the adults and an exposure time of 13.2 seconds, 66 kV, 9 mA for the children.
- Statistical methods:** Statistical data processing was performed by using the SPSS (for Windows). The level of significance was set at $p < 0.05$. Charts were created by graphical analysis using the Microsoft Excel 2016.

RESULTS

One thousand (1,000) patients were examined in a period of one calendar year at the Department of Oral Surgery and the Department of Pediatric Dental Medicine of the Faculty of Dental Medicine at the Medical University of Plovdiv (Table 2).

Table 2. Characteristics of the patients studied

Characteristics	mean $\pm$ SE		
Age (years)	31.527 $\pm$ 16.954		
Minimum	4		
Maximum	72		
Male	30.48 $\pm$ 0.809		
Female	32.41 $\pm$ 0.713		
	Number	%	Sp
Sex			
Male	461	46.1	1.58%
Female	539	53.9	1.58%
Total	1,000	100	

The mean age of the patients was 31.527 years, with the youngest being 4, and the oldest – 72. The relative share of female and male patients was 53.9% and 46.1%, respectively. The mean age of male and female patients was 30.486 ± 17.37 years and 32.417 ± 16.55 years, respectively.

The analysis of the frequency distribution of the studied patients by age groups showed that most of them were in their third decade, followed by the fifth and the fourth decades. No statistically significant difference in the distribution by age groups was found between the two sexes (Pearson Chi-Square = 0.044; $p > 0.05$) (Fig. 1).

Fig. 1. Distribution of patients of age groups

The majority of the patients (79.8%) had permanent dentition, followed by those with mixed dentition (19.7%), and the lowest was the number of the patients with primary dentition (0.5%).

A statistically significant difference was found between the presence of ST in the permanent and mixed dentition, with a 3% relative proportion of ST in the mixed and 0.62% in the permanent dentition (Fisher's exact test = 0.024; $p < 0.05$). The relative proportion of ST was greatest in the age group 40 to 10, followed by the age group of over 61, the fourth and the second decade, which was deemed statistically significant (Fisher's exact test = 0.002, $p < 0.05$) (Fig. 2).

The occurrence of supernumerary teeth was assessed as being 1.1-1.3% for the male and 0.9% for the female studied patients. No statistically significant difference between sexes was found for the presence of ST (Pearson Chi-square = 0.572; $p > 0.05$).

The relative proportion of ST was 90.9% for the maxilla and 9.1% for the mandible (Table 3). A statistically significant difference ($p < 0.05$) was found in the distribution of ST by jaws.

Table 3. Distribution of the diagnosed ST by jaws

Location of the ST in the jaws	N	%	Sp
Maxilla	10	90.9%	8.62%
Mandible	1	9.1%	8.62%
Total	11	100%	

A larger relative proportion of mesiodens and distomolar was found in the male patients, while in the female patients, ST were distributed in decreasing order from medial to distal (Fig. 3).

DISCUSSION

Finding the prevalence of dental abnormalities is important for dental practitioners, anthropologists and other healthcare professionals. There are significant differences between some epidemiological studies. Finding prevalence is difficult due to differences resulting from variations in demographic and environ-

mental factors. We found that the prevalence of ST was 1.1%. The same prevalence was reported by Syriac et al. [5]. Hyperdontia prevalence in the general population is between 0.09-0.29%, and according to other authors, it reaches 1.53-1.57% [1, 3, 4, 7]. Alberti et al. [8] found an incidence of 0.38% in the age between 6 and 10 years, with a significant increase in the relative proportion in the 9-year-olds (0.64-1.06%). We found an incidence of 4.44% in the patients aged 4-10 years. B. Backman, Y.B Wahlin found hyperdontia prevalence of up to 1.9% in 7-year-old children in Sweden [9]. Koch et al. [10] found a ST prevalence of 1-3% in the permanent dentition, and according to Rajab Hamdam [11], the prevalence was 0.1-3.8% in the permanent dentition and 0.3-0.8% in the primary dentition [3, 12, 13]. Gopakumar D et al. [12] reported 0.39% prevalence in patients in India. Öztas B et al. [4] found 1.6% ST prevalence in patients aged 13-70. Leco-Berrocal et al. [14] reported a ST prevalence of 1.05% in individuals aged 7-34 in Madrid. The reported incidence in the Mexican population was 3.2% in individuals aged 2-55 [15]. The observed deviations in hyperdontia prevalence are due to age differences in the studied patient groups.

According to other authors, the relative proportion of ST in the permanent dentition of different populations was 0.5-5.3% [3, 16]. Tumen et al. [17] found a prevalence of 1.45% in outpatient Turkish population aged 12-25. Esenlik et al. [18] reported 2.3% incidence of ST in the permanent dentition of the Turkish population; however, no distomolars were found as the study was carried out in younger individuals (age group 6-16 years) and distomolar formation occurs later.

Supernumerary teeth are more common in the permanent (0.5-3.8%) than in the primary dentition [1, 3, 9-24]. The great difference between the two dentitions, in terms of the incidence of supernumerary teeth, is probably due to the fact that hyperdontia in the primary dentition remains unnoticed by the parents as it does not cause any other abnormalities [23]. In primary dentition, a maxillary lateral incisor is

Fig. 2. Distribution of the diagnosed ST by age group

Fig. 3. Distribution of ST by sex

most common, followed by maxillary and mandibular canines, unlike permanent dentition [24]. In our study, the most common type of ST was mesiodens (72.72%), followed by distomolar (27.27%) and paramolar (18.18%). Most of the “supplemental teeth” in the primary dentition are conical or eumorphic, and usually this abnormality remains unnoticed as the supernumerary teeth erupt at normal time, have normal morphology and correct position and, also, they may be confused with fusion or gemination [1, 24, 25].

Supernumerary teeth are found more frequently in males than in females, in a 2:1 ratio for the permanent dentition, although according to some authors the ratio varies from 1.7:1 to 4.5:1 [3, 4, 8, 11, 19-22, 24, 25]. According to Öztaş [4], the ratio in the Turkish population is 1.2:1, and according to Celikoglu et al. [6] it is 1.8:1, whereas no significant differences were found in the primary dentition. We found a ratio of 1.2:1 in favour of the males, the same as Öztaş. Contrary to most authors, Clayton, Bäckman and Wahlin reported higher proportion of supernumerary teeth in females [19]. Subphenotypes of supernumerary teeth are differently distributed in both sexes – they are more common in the midline and in the premolar region in males, but in females, the incisors and canines are more common [19]. In our study, a higher incidence of mesiodens and distomolar (1.08% and 0.22%, respectively) was found in males, and a decreasing relative proportion from the midline to distally in females (mesiodens – 0.56%, paramolar – 0.19%, distomolar – 0.19%).

Some authors found that 67 to 77.5% of the cases of hyperdontia affect the maxilla [20,26], and, according to others, both jaws are equally affected [27], with 97.5% of the supernumerary teeth being in the incisor region [7, 8, 20, 22, 28]. Our results show predominant involvement of the maxilla (90.9%), with the incisor region being affected in 72.72% of the cases.

The relative proportion of mesiodens is 47-67%, with prevalence in the general population of 0.15 to 1.9% [3, 8, 28, 29]. We found a mesiodens incidence of 0.8% in the general population. A recent Indian study reported a higher prevalence rate of 3.18%, showing either an increase in the incidence or ethnic variability [29].

Distolomars are the next in incidence and represent 26% of the supernumerary teeth, found in 0.13-0.6% [3], and according to Arslan – in 0.57% of the general population [26]. In our study, the proportion of distomolars was 27.27%, and their prevalence in the general population was 0.3%.

Paramolars are in the range between 3 and 9% of all supernumerary teeth and their incidence is in the

range from 0.29 to 0.64% [30]. We found a proportion of paramolars of 18.18% and prevalence in the general population of 0.2%.

Parapremolars were found to be about 10% of all supernumerary teeth, with 75% of them in the mandible [25, 31].

CONCLUSIONS

Supernumerary teeth are a relatively rare dental abnormality in the Bulgarian population. Its distribution by sex and morphology corresponds to the prevalence in Caucasians and populations of southern countries. Our study confirmed the finding of other authors that supernumerary teeth occur more frequently in the maxilla, probably due to its more complex embryonic development and the deviations that may occur in this process. Supernumerary teeth are most common in the premaxilla.

Conflicts of interest

The author declare no conflicts of interest.

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