

Prevalence of Dental Number Anomalies Among A Group of Turkish Children

SUMMARY

Background/Aim: The study aimed to evaluate the prevalence and distribution of congenital dental number anomalies in the permanent dentition among a group of Turkish children in the Inner Aegean Region of Turkey. **Material and Methods:** A total of 5377 patients aged 7–9 who visited our clinic for the first time between September 2018 and September 2019 were investigated. The children were examined for tooth agenesis and supernumerary teeth using panoramic radiographs taken for various reasons and clinical records reviewed. Dental number anomalies were evaluated according to gender and localization. Descriptive and comparative statistical analyses were performed using the SPSS package software program Version 23. **Results:** For the study, the data of 1987 patients (947 female, 1040 male) were examined. The tooth agenesis was found in 109 patients (5.5%), the supernumerary teeth were found in 24 patients (1.2%). The prevalence of tooth agenesis was 5% in males, 6% in females. There was no statistical difference between genders ($p > 0.05$). The distribution of tooth agenesis according to jaws and sides by gender was not statistically different ($p > 0.05$). The most commonly missing teeth were mandibular left second premolar (37.6% of patients) and mandibular right second premolar (33% of patients). According to types of teeth and gender, molar tooth agenesis was seen more common in females than males ($p < 0.05$), there was no significant difference in other types of teeth by gender. The prevalence of supernumerary teeth were 1.9% in males, 0.4% in females and the difference between genders was found to be statistically significant ($p < 0.05$). All the supernumerary teeth were located in the anterior maxilla, and half of them were mesiodens. **Conclusions:** Early diagnosis and appropriate treatment choice are very important managing complications associated with congenital dental number anomalies and for differential diagnosis of characteristic syndromes.

Keywords: Dental anomaly, Tooth agenesis, Hypodontia, Supernumerary teeth, Permanent dentition

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Introduction

Developmental dental anomalies are classified as number, position, structure, shape, and size anomalies. Dental number anomalies, which have attracted the attention of many researchers, are one of the most common dental anomalies¹⁻³. Tooth agenesis includes hypodontia, which occurs when one to six teeth are absent

except the third molars; oligodontia, which occurs when more than six teeth are absent; and anodontia, which occurs when all teeth are absent. Supernumerary teeth (hyperdontia) are extra teeth or tooth-like structures formed from a tooth germ in excess of the normal number⁴.

A combination of environmental and genetic factors play a role in the occurrence of dental number anomalies,

and they may either be associated with a syndrome or found in non-syndromic patients^{5,6}.

Tooth agenesis may lead to functional, aesthetic, orthodontic, periodontal, psychological, and social problems¹. Additionally, tooth agenesis may be a marker for certain types of cancer^{7,8}.

Supernumerary teeth may erupt normally, exhibit ectopic eruption, or may be impacted. They may cause numerous complications, including aesthetic and orthodontic problems, eruption failures, odontogenic cystic lesions, and root resorption⁹.

The prevalence of dental number anomalies varies depending on the ethnicity, prevalence of other risk factors, and study methods. In studies, the prevalence of hypodontia worldwide varies from 0.3% to 11.3%, and the prevalence of supernumerary teeth varies from 0.1% to 3.8%^{2,3,10-17}.

The study aimed to evaluate the prevalence and distribution of congenital dental number anomalies in the permanent dentition among a group of Turkish children in the Inner Aegean Region of Turkey.

Material and Methods

This study was approved by the Ethics Committee of the Faculty of Medicine (2019/202). A total of 5,377 patients aged 7–9 who visited our clinic for the first time between September 2018 and September 2019 were investigated. The children were examined for tooth agenesis and supernumerary teeth using panoramic radiographs taken for various reasons (orthodontics, caries, etc.) and clinical records from the pedodontics clinic reviewed by one calibrated researcher. Standardization of the method and diagnosis was ensured as the same operator examined all radiographs. In all cases, the radiographic findings were checked against and consistent with the previously recorded information in the clinical records.

Tooth agenesis was recorded when a tooth was absent on the panoramic radiograph, excluding a history of loss due to any reason (trauma, caries, periodontal disease, or orthodontic extraction). Moreover, agenesis of the third molar is not included in the present study. Supernumerary teeth were recorded when extra teeth were observed on the dental arch. Patients with uncertain diagnoses and those with any syndrome or cleft lip/palate were excluded from the study. Dental number anomalies were evaluated according to gender and localization.

Descriptive and comparative statistical analyses were performed using the SPSS package software program (Statistical Package for Social Science Version 23, Chicago, IL, 2015). Descriptive analyses were given as numbers and percentages. Differences in number anomalies according to gender and localization were

analyzed using the chi-square test. The level of statistical significance was set at $p < 0.05$.

Results

For the study, the data of 1987 patients (947 female, 1040 male) were examined. In this study, the prevalence of tooth agenesis was 5% ($n=52$) in males, 6% ($n=57$) in females. There was no statistical difference between genders ($p=0.319$). The mean ages of patients were 8.13 ± 0.806 . The tooth agenesis was found in 109 patients (5.5%). Hypodontia was found in 107 patients (5.4%), oligodontia was found in 2 patients (0.1%). The numbers of total missing teeth were 214.

Among 109 patients with tooth agenesis, 48.6% had single tooth agenesis, and 51.4% had multiple tooth agenesis (>1). Single tooth agenesis was found in 49.1% of females and 48.1% of males. Multiple tooth agenesis was found in 50.9% of females and 51.9% of males. No statistically significant difference was found between the genders ($p=0.913$).

Tooth agenesis was seen only in the maxilla in 37.6% of the patients, only in the mandible in 53.2% of the patients, and in both jaws in 9.2% of the patients. The distribution according to jaws by gender was not statistically different ($p=0.578$). Tooth agenesis was seen only in the right side in 27.5% of the patients, only in the left side in 22% of the patients, and both sides in 50.5% of the patients. The distribution according to sides by gender was not statistically different ($p=0.373$).

The average number of tooth agenesis per person was found to be 1.98 ± 2.483 (minimum 1, maximum 20). There was no statistical difference by gender ($p=0.111$).

The most commonly missing teeth were mandibular left second premolar (37.6% of patients) and mandibular right second premolar (33% of patients). There was no agenesis of mandibular left first premolar and mandibular right second premolar (Table 1). According to types of teeth and gender, molar tooth agenesis was seen more common in females than males ($p=0.046$). There was no significant difference in other types of teeth by gender (for central incisor $p=0.908$, for lateral incisor $p=0.862$, for canine $p=0.463$, for premolar $p=0.862$).

According to jaws and type of tooth, the premolar tooth agenesis was seen more common in the mandible (74.1%) than in the maxilla (39%) and the lateral incisor agenesis was seen more common in the maxilla (63.4%) than in the mandible (20.7%). The statistical differences were significant ($p < 0.001$). Central incisor, canine and molar teeth agenesis were seen in both jaws commonly, and the difference between single jaw was statistically significant ($p=0.017$, $p=0.005$, $p=0.018$, respectively).

Table 1. The distribution of the tooth agenesis according to localization

JAW	SIDE	TOOTH	NUMBER OF MISSING TEETH n (%)
Maxilla	Right	Central incisor	1(0.9%)
		Lateral incisor	22(20.2%)
		Canine	3(2.8%)
		First premolar	5(4.6%)
		Second premolar	16(14.7%)
		First molar	3(2.8%)
		Second molar	1(0.9%)
	Left	Central incisor	1(0.9%)
		Lateral incisor	24 (22%)
		Canine	3(2.8%)
		First premolar	5(4.6%)
		Second premolar	14(12.8%)
		First molar	3(2.8%)
		Second molar	1(0.9%)
Mandible	Right	Mesiodens	3(2.8%)
		Lateral incisor	5(4.6%)
		Canine	3(2.8%)
		First premolar	2(1.8%)
		Second premolar	36(33%)
		First molar	2(1.8%)
		Second molar	0(0%)
	Left	Mesiodens	3(2.8%)
		Lateral incisor	10(9.2%)
		Canine	4(3.7%)
		First premolar	0(0%)
		Second premolar	41(37.6%)
		First molar	2(1.8%)
		Second molar	1(0.9%)

48.6% of the patients had unilateral tooth agenesis, and 51.4% had bilateral tooth agenesis, and there was no significant difference according to gender ($p=0.913$).

The supernumerary teeth were found in 24 patients (1.2%) and the numbers of supernumerary teeth were 29. The average number of supernumerary teeth per person was found to be 1.21 ± 0.415 .

The prevalence of supernumerary teeth was 1.9% in males ($n=20$), 0.4% ($n=4$) in females, and the difference between genders was found to be statistically significant ($p=0.001$).

Among 24 patients, single-tooth excess was found in 79.2% of all supernumerary cases. This rate was higher in males (85%) than in females (50%) but, there was no statistical difference between the genders ($p=0.146$).

All the supernumerary teeth were located in the anterior maxilla (Table 2). Among supernumerary cases, mesiodens was found in 62.5% of the patients, the supplementary lateral incisors were found in 29.2% of the patients. The distribution of supernumerary teeth according to the type of teeth by gender was statistically non-significant ($p=0.839$).

Table 2. The distribution of the supernumerary teeth according to localization

JAW	SIDE	TOOTH	NUMBER OF SUPERNUMERARY TEETH n (%)
Maxilla	Right	Mesiodens	15(62.5%)
		Lateral incisor	5(20.8%)
	Left	Mesiodens	6(25%)
		Lateral incisor	3 (12.5%)

Discussion

In studies, prevalence of hypodontia in worldwide varies from 0.3% to 11.3%.^{2,3,10-13,17} Tooth agenesis was found to be the most common dental anomaly in the Turkish population. In studies, the prevalence of permanent tooth agenesis was between 1.6% and 8.5% in Turkey^{2,3,18-22}. In this study, the prevalence of tooth agenesis, excepting third molars, among a group of children in the Inner Aegean Region was 5.5%.

In this study, tooth agenesis of permanent teeth was similar in males and females, similar to the other studies²³⁻²⁵. Otherwise, some of the studies reported a higher prevalence of tooth agenesis in females than in males^{5,17,26,27}. The inconsistent results of previous studies were attributed to ethnic differences, variable study techniques, and different diagnostic criteria.

Concerning the average of missing teeth per individual, there are differences between the studies^{5,22,23,27}. A study that evaluated six regions of Turkey showed that generally, females had a significantly higher average rate of missing teeth per individual.²² In the present study, no statistical difference was found between genders. The different results can be attributed to study groups and methods.

In the literature, the results for tooth agenesis relative to which jaw is predominant are not conclusive^{5,23,27,28}. In this study, more missing teeth were found in the mandible (53.2%) than in the maxilla (37.6%). This result is in agrees with the study of Kirzioglu *et al.*, which was carried out in a geographically close area²⁰.

In studies excluding third molar teeth, the reported prevalence rates for agenesis of each tooth vary according to the study population. In this study, the most common type of congenital missing tooth was the mandibular second premolar (36% of all missing teeth). The results of previous studies from the United Kingdom^{29,30}, Middle East countries¹⁰⁻¹², Scandinavian countries^{28,31}, and European countries³² were similar to the present study. In studies conducted in Turkey, the mandibular second premolar tooth was reported as the most common missing tooth among the patients of the pediatric dentistry department, but the maxillary lateral incisors are the most commonly missing teeth among patients of the orthodontics department^{3,18,20}. This result may be related to patients with anterior tooth agenesis are most often referred to orthodontics departments because of aesthetic anxiety. Additionally, in this study, it was found that the agenesis of premolars and lateral incisors, which are the most missing, are usually seen in one jaw. In contrast, other rarely missing teeth can be seen in both jaws.

According the distribution of missing teeth between the right and left sides of the jaws, most studies found a similar rates between sides of the jaws^{3,23,33}. In this study, 22% of patients have tooth agenesis on the left side, 27.5% of patients have tooth agenesis on the right side, unilaterally. Also, most authors have stated that bilateral tooth agenesis is more common than unilateral tooth agenesis^{33,34}. In this study, bilateral tooth agenesis (51.4%) was similar to unilateral (48.6%).

The prevalence of supernumerary teeth has been reported in non-syndromic patients at a range of 0.3% to 2.7% in Turkey³⁵⁻³⁸. In the present study, similar to other studies, the prevalence of supernumerary teeth was 1.2%. In white European population, In Finnish population, in Spanish population and in Bulgarian population the prevalence of supernumerary teeth were 1.6%, 2.2%, 1.84% and 1.1% respectively³⁹⁻⁴². Racial variations, age differences among patients, different study protocols and diagnostic methods may explain the wide range of prevalence cited in the literature.

When the distribution of the supernumerary teeth by gender was examined, it was found that males (1.9%) were more affected than females (0.4%) nearly at a 5:1 ratio, in accordance with most of the previous studies reported that supernumerary teeth are more dominant in males^{15,17,35,43}.

Supernumerary teeth may manifest in any region of the dental arches and may involve any tooth. In this study, all the supernumerary teeth were located on the anterior

maxilla, and half of them were mesiodens. This result is similar to previous studies, which reported that mesiodens are the most frequently observed supernumerary teeth, especially in young patients^{35-38,44}.

Supernumerary teeth may occur as single, double, or multiple teeth in the mandible, maxilla, or both. Previous studies reported that supernumerary teeth were usually single, which is similar to the present study (79.2%), and they were more common in males than in females^{35,37,45}. Unilateral supernumerary teeth were reported frequently by other researchers^{35,39}. This study's results differ from previous studies in that supernumerary teeth were classified as unilateral, bilateral, and midline. Respectively, their rates were found to be 29.2%, 20.8%, and 50%.

Conclusions

The epidemiological studies of dental anomalies can contribute to an understanding of the differences between populations. It is important to have information about dental anomalies, make satisfactory treatment decisions, avoid late treatment costs, prevent the growth and development process, and improve the quality of life for the patient. The treatment should be multidisciplinary and planned according to the patient's age, severity of anomalies, occlusion, craniofacial morphology, the patient's oral hygiene habits, and expectations. Early diagnosis and appropriate treatment choice are very important for managing complications associated with congenital dental number anomalies.

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