





Prevalence of Tooth Number Anomalies and Their Distribution by Genders

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ABSTRACT

Objective: This study aims to examine the dental anomalies (tooth number, size, and structural anomalies) in a group of pediatric dental population and the difference between the genders in terms of the prevalence of these anomalies.

Methods: In this retrospective study, digital orthopantomograms belonging to 5000 patients aged 5-14 years, taken at the Faculty of Dentistry of Erciyes University were evaluated. Tooth number anomalies (hypodontia, hyperdontia, anodontia, and mesiodens) and dental pathology (odontoma and cyst-tumor) were evaluated in orthopantomograms. The frequencies of dental anomalies were compared, and their distribution by gender was examined using descriptive tests and chi-square tests.

Result: Of 5000 patients, 169 (3.38%) had 1 dental anomaly. Of the patients, 137 (81%) had hypodontia, 27 (15.9%) hyperdontia, 6 (3.5%) mesiodens, 2 (1.1%) odontoma, and (1.7%) cysts-tumor-like structures. The prevalence of hypodontia was found to be higher in girls than in boys ($P < .05$). There was a difference between the genders in terms of the prevalence of hypodontia ($P < .05$). No difference was found between the genders in terms of other dental anomalies ($P > .05$).

Conclusion: Whether common or rare, dentists should be careful about the presence of dental anomalies while examining their patients. Detecting these anomalies and performing interventions in the required period is important to prevent complications that may occur in the future. In this way, psychological, aesthetic, phonational, and physical problems that may occur in the future lives of children and adolescents can be prevented.

Keywords: hyperdontia, hypodontia, macrodontia, Tooth number anomalies, tooth size anomalies, tooth structural anomalies

INTRODUCTION

Dental anomalies are changes in terms of morphology, position, size, and number of teeth.¹ Dental anomalies are divided into 2 sub-groups as developmental and acquired anomalies. Developmental dental anomalies (DDAs) occur during tooth developmental stages, which cover the morphodifferentiation and histodifferentiation periods. Acquired dental anomalies (ADAs) are caused by the changes that occur after the normal tooth developmental stages are completed.² Developmental dental anomalies constitute an important category of dental problems.³ These anomalies can be observed alone (non-syndromic) or may develop as a part of a syndrome.⁴ A DDA may be asymptomatic, or it may manifest itself with malocclusion, aesthetic and functional problems, and a tendency to other oral diseases.³ These anomalies may cause deterioration in dental arches and affect dental eruption,⁵ making clinical management important.³

Developmental dental anomalies affect tooth size (microdontia and macrodontia), tooth shape (dens invaginatus, talon tubercle, dens evaginatus, germination, fusion, root dilution,

taurodontism, and concretion), tooth number (hyperdontia, hypodontia, and oligodontia), and tooth structures in dental tissues (amelogenesis imperfecta, dentinogenesis imperfecta, and dentin dysplasia).⁶ These are usually detected during routine dental examinations.³ While panoramic radiographs determine the status of dental anomalies and pathologies, they allow the diagnosis and treatment planning of various jaw and facial diseases.⁷ The fact that dental anomalies mostly occur in childhood and the inexperience of dentists in diagnosing them causes incurable dental problems in pediatric patients.⁸ While the early diagnosis may provide optimal patient management and treatment planning, delay in treatment complicates future treatment and causes psychological problems.^{7,8}

Although dental anomalies are common in many populations,⁹ their prevalence in different population groups provides important information for phylogenetic and genetic studies.³ Knowing the prevalence of dental anomalies in populations is important for dentists to be more careful about that anomaly during routine examinations as well as to prevent possible complications and wrong-site tooth extractions.

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This retrospective study aims to evaluate the prevalence of dental anomalies in a group of pediatric population living in the Anatolia (Cappadocia) region.

METHODS

Ethics committee approval for the study was obtained from Erciyes University’s non-clinical research ethics committee (October 9, 2019, Decision no: 2019/687).

Study Design

In this retrospective study conducted between January 2018 and December 2019, it was calculated that at least 4994 orthopantomograms (OPTs) should be evaluated according to power analysis ($\alpha=0.05$, $\beta=0.80$). Considering the losses that may occur, OPTs of 5115 patients who presented to the Department of Pediatric Dentistry were evaluated.

Inclusion and Exclusion Criteria

Patients between the ages of 5 and 14, without systemic disease, and with clear orthopantomograms taken for diagnosis and treatment were included in the study. Images from patients with systemic disorders such as syndromes, or cleft lip and/ or palate, previous jaw surgery, extracted teeth, prosthodontic, or orthodontic treatment were excluded from the study. The radiographs of the patients who had more than 1 radiograph (by examining 2 radiographs together) were evaluated. One hundred fifteen of the 5115 OPTs examined in this context were excluded from the study. Wisdom tooth deficiencies were not considered as hypodontia. Assessment of the OPTs was performed directly on the same monitoring independently by 2 calibrated examiners (B.D. and C.D.) (Cohen’s kappa=80%). In case of disagreement, the discussion was made to reach a consensus. Radiographs of a total of 5000 patients were included in the study.

Statistical Analyses

The data were entered into the Statistical Package for the Social Sciences version 20.0 (IBM SPSS Corp.; Armonk, NY, USA) according to the gender and age of the patients, tooth number anomalies (hypodontia, hyperdontia, oligodontia, and anodontia), and odontoma and cyst and tumor-like dental pathologies. Descriptive analysis was made using frequency analysis, and the chi-square test was used for comparison between the genders. The statistical significance was P value $<.05$.

Main Points

- This study was researched to determine dental anomalies in a group of pediatric population in the Anatolia (Cappadocia) region.
- The study aimed to investigate the difference between the genders in terms of the prevalence of dental anomalies.
- It is aimed to increase the attention of dentists in terms of the prevalence of dental anomalies during a routine examination.

RESULTS

Dental anomalies were observed in 169 (3.38%) of 5000 patients. 50% of the patients were female. The average age of the patients was 9 ± 21 .

The frequency and percentages of the probability of anomaly occurrence in all the examined patients are given in Table 1.

The distribution of the number of dental anomalies and tooth numbers by gender is given in Figure 1.

Of the 27 (15.9%) patients with hyperdontia, 40% were female. While 1 extra tooth was observed in 24 patients (14.2%) (10 girls and 14 boys), 2 extra teeth were observed in 3 (1.8%). Hyperdontia was mostly observed in the right (7 girls and 12 boys) and left (5 girls and 12 boys) quadrants of the upper jaw, while mesiodens, which was specific in the upper midline, was detected in 6 (3.5%) patients (1 girl and 5 boys).

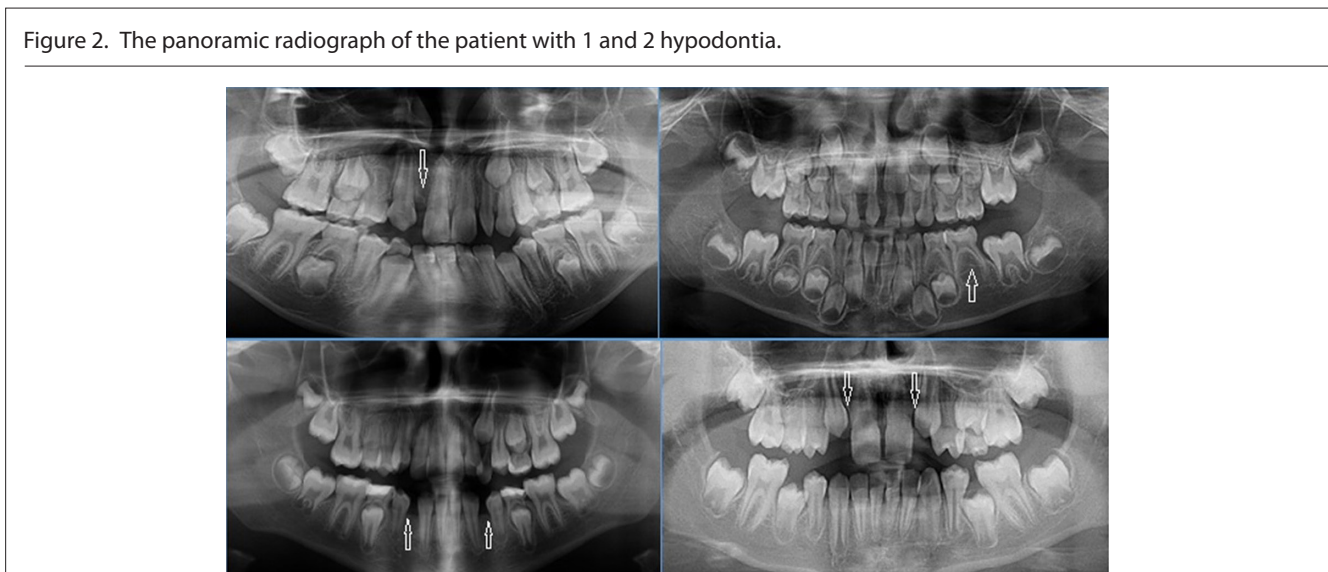
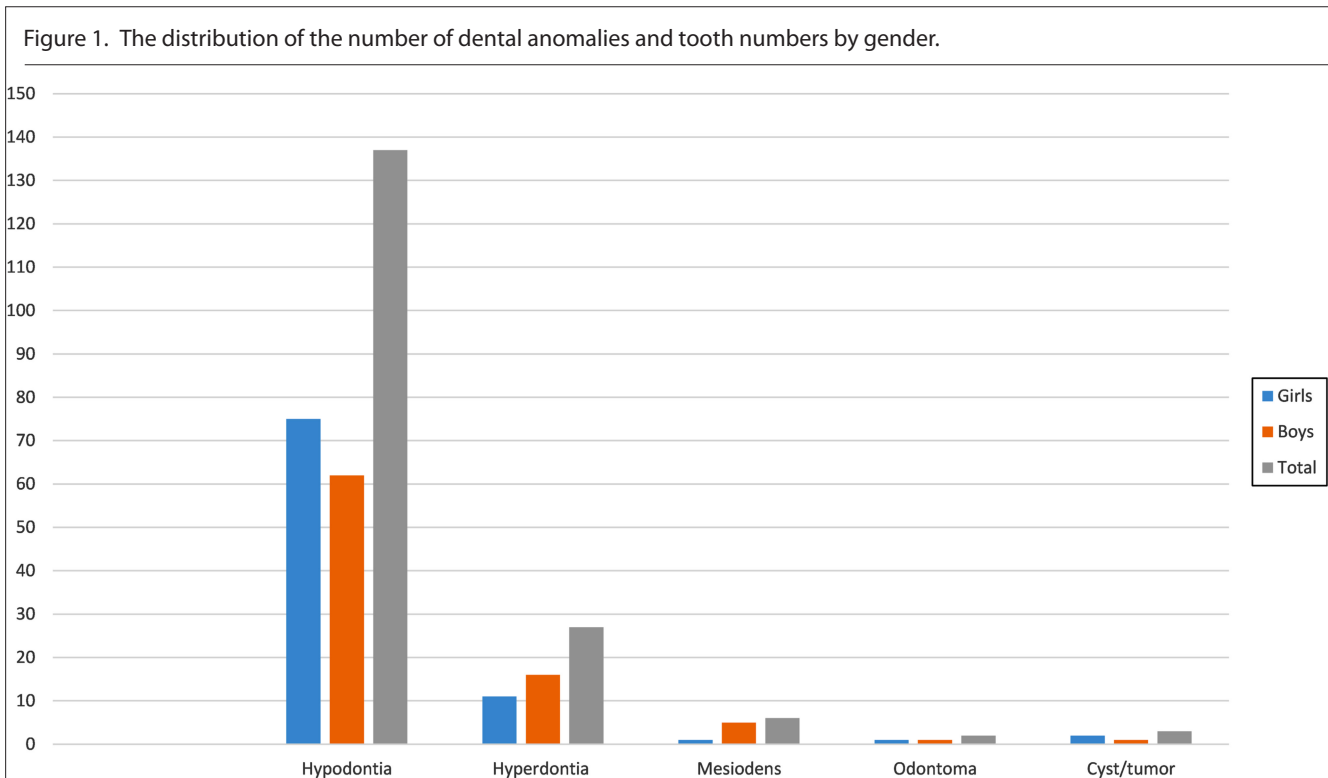
Hypodontia was observed in 137 (75 girls and 62 boys) patients (81.0%); 73 (43.1%) of the patients (41 girls and 32 boys) had 1 tooth missing, 50 (29.5%) had 2 teeth missing, (Figure 2) 4 (2.3%) (2 girls and 2 boys) had 3 teeth missing, 9 (5.32%) (4 girls, 5 boys) had 4 teeth missing, 2 (1.1%) (1 girl and 1 boy) had 5 teeth missing, and 2 (1.1%) (1 girl and 1 boy) had 11 teeth missing (oligodontia). Missing teeth were mostly observed in the left lower quadrant (69 teeth, 40.8%) (38 girls and 31 boys), followed by the right lower quadrant (67 teeth, 39.6%) (33 girls and 34 boys), the right upper quadrant (48 teeth, 28.4%) (25 girls and 23 boys), and the left upper quadrant (46 teeth, 27.2%) (28 girls and 18 boys). Hypodontia was seen most frequently in girls, and a statistically significant difference was found between the genders in terms of hypodontia ($P = .026$).

There was no significant difference between the genders in terms of the prevalence of supernumerary teeth, mesiodens ($P > .05$).

Table 1. The Frequency and Percentages of Anomaly Occurrence in all the Examined Patients

Dental Anomalies	Gender		Total, n (%)	P
	Girls	Boys		
Hypodontia	75	62	137 (81)	.02*
Hyperdontia	11	16	27 (15.9)	.29
Mesiodens	1	5	6 (3.5)	.09
Odontoma	1	1	2 (1.1)	.10
Cyst/tumor	2	1	3 (1.7)	.56
Total	90	85	175 (100)	

* $P < .05$.



DISCUSSION

Early diagnosis of DDAs is important because they cause aesthetic and functional problems in the future. Raising awareness in dentists about anomalies will facilitate diagnosis and treatment. In this study, the prevalence of dental anomalies (tooth number anomalies, tooth size anomalies, and structural anomalies) in children and adolescents and their distribution by gender were investigated.

Cunha et al⁹ examined 523 panoramic radiographs belonging to patients between the ages of 4 and 12 and found dental

anomalies in 82 patients (15.68%). Another study conducted in Australia evaluated 1050 panoramic radiographs, and the prevalence of dental anomalies was reported as 5.14%.¹ Another study in Italy determined the prevalence of dental anomalies as 20.9%.¹⁰ A study examined tooth shape, number, structure, and size anomalies in an Indian population and reported the anomaly prevalence as 34.2%.¹¹ In the study conducted in a Turkish population, 1200 panoramic radiographs of patients aged between 6 and 40 were evaluated, and the prevalence of dental anomalies was found to be 39.2%. As seen in our study, dental anomalies were detected in 169 (3.38%) of 5000 patients aged 5-14 years.

Not including shape and position anomalies in the study may be the reason for detecting the prevalence of dental anomalies lower than that reported in other studies.

Carvalho et al¹² found the prevalence of hypodontia to be 0.4% and the prevalence of hyperdontia to be 0.8% in their study on 750 Belgian children. This is similar to the findings of Brook et al¹³ who found the prevalence of hypodontia as 0.3% and the prevalence of hyperdontia as 0.8% in their study in England. In the study by Ravn et al¹⁴ conducted in Denmark, it was reported that 0.5% of 4564 patients had hypodontia and 0.6% had hyperdontia. In light of these studies, it can be stated that hypodontia is more prevalent and hyperdontia is less prevalent in the Turkish population than in Belgian, Dane, and British populations. Furthermore, Cunha et al⁹ stated that hypodontia was the most common dental anomaly. In the study by Gomes et al¹⁵ 1049 Brazilian patients (6.3%) were reported to have hypodontia. Another study from Italy reported that the most common anomaly was determined as the displacement of canine teeth, followed by hypodontia with 7.1%.¹⁰ In our study, hypodontia was encountered most frequently (2.74%) in the studied population. Hypodontia constituted 81% (n = 137) of all DDAs in this study. The findings reported by the said studies as well as our results support the assumption that the frequency of dental anomalies varies among populations.

In the study by Chen et al¹⁶ 2611 children (1442 boys and 1169 girls) between the ages of 2 and 6 were examined and as a result, primary mandibular incisors were most commonly found missing. Another study by Bekiroğlu et al⁷ showed that the most frequently missing tooth was the lower premolar tooth. In the literature, there are studies showing the lower premolars as the most frequently missing tooth^{1,10} and the maxillary lateral teeth as the second most frequently missing ones.^{1,17} This is supported by our finding that lower premolars were the most frequently missing teeth.

Some studies reported no difference between the genders in terms of the prevalence of anomalies. However, contrary to these findings, 2 studies^{18,19} determined a higher prevalence of hypodontia in women than in men. This is also supported by our findings that show a significantly higher frequency of hypodontia in girls than in boys. This finding emphasizes the need for dentists to be more careful about early intervention, especially in girls who are more sensitive about their appearance since hypodontia may lead to aesthetic problems in the future.

In a study examining 152 children between the ages of 5 and 15, it was stated that supernumerary teeth were seen more in boys than in girls, which is in parallel with our study.²⁰ This result supports the finding reported by most studies that supernumerary teeth are more prevalent in men.^{21,22} However, there was no statistically significant difference between the genders in terms of supernumerary teeth and mesiodens. Cunha et al⁹ found a total of 7 supernumerary tooth cases in 134 anomaly cases. In their study, it was stated that there was no statistically significant difference between the genders. In our study, supernumerary teeth were observed in 27 patients, with a higher prevalence in boys

(11 girls and 16 boys). However, a statistically significant relationship was not found between the presence of a supernumerary tooth and gender.

Salcido-Garcia et al²³ reported that supernumerary teeth were present in 3.2% of 2241 patients, 48.6% of whom had mesiodens. Araz et al²⁴ found supernumerary teeth in 4.33% of the children, and the most common supernumerary tooth was mesiodens (64.4%). In our study, 0.7% of the patients had supernumerary teeth, 22% of which were mesiodens.

A study conducted in Brazil in 2013⁹ reported that dental anomalies (supernumerary teeth, endodontics, ankylosis) were more prevalent in women than in men. This can probably be attributed to the sample and race differences as well as local environmental impacts.

The fact that size, shape, and position anomalies are not included in our study prevents the generalization of our findings to all DDAs. Also, the study covers a cross-sectional region in the country. We believe that our study is important in terms of showing the prevalence of tooth number, tooth size, and structural anomalies and revealing the difference between the genders. Further studies are needed to evaluate the DDAs in different populations across the country.

CONCLUSION

It can be inferred from our findings that, apart from hypodontia, there was no significant difference between male and female patients in terms of the distribution of dental anomalies. Hypodontia may result in functional, phonational, and potential orthodontic and esthetic problems in the future. The study emphasizes the necessity for early diagnosis and management of anomalies to prevent the occurrence of psychological problems, especially in girls who care more about their appearance. In addition, the most prevalent dental anomaly was hypodontia among the patients included in our study. For this reason, dentists should be very careful about anomalies during a routine examination since preventing complications is possible with early diagnosis and treatment.

Ethics Committee Approval: This study was reviewed and approved by Erciyes University Non-Invasive Clinical Research ethics committee (Date: October 9, 2019, Decision no: 2019/687).

Informed Consent: There was no informed consent required as this was a retrospective study.

Peer-review: Externally peer-reviewed.

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Declaration of Interests: The authors declare that they have no competing interest.

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