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Frequency of dental anomalies in children with primary and mix dentition: A retrospective radiographic study

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ABSTRACT

Aim: To determine the dental anomaly frequency in a Turkish subpopulation using panoramic radiographs (PRs).

Methods: A total of 1,068 PRs were recruited in the study. Dental anomalies were evaluated and recorded in terms of number, size, shape, and structure in children aged from 2 to 14 years. Age, gender, and early loss of permanent first molar teeth of the patients were also recorded.

Results: Of 1,068 radiographs, 465 belonged to female patients and 603 to male patients. The most common dental anomalies in this study were missing teeth (4.8%), impacted teeth (1.3%), and infraocclusion (0.7%), respectively.

Conclusion: Dental anomalies are prevalent in the society. The occurrence of dental anomalies in both primary and permanent teeth indicates that the importance of early diagnosis to prevent further problems. Early diagnosis and an appropriate treatment approach can prevent temporomandibular joint problems, difficulties in speech and mastication, malocclusion, esthetic, and periodontal problems of the patients.

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Introduction

Dental anomalies are states of deviation in tooth number, shape, eruption, and morphology [1]. The etiology of dental anomalies can be either genetic or environmental factors during the morpho-differentiation or histo-differentiation stages of tooth development [2]. In many studies, including clinical and radiographic evaluation in children is reported to be varying regarding the frequency of dental anomalies [3–6]. Early detection of dental anomalies and the required intervention is important to avoid delayed complications. Dental anomalies can cause various problems making their clinical management complicated [6,7]. These problems are increased susceptibility to caries, eruption problems, attrition of tooth structures, breastfeeding problems, occlusal interference, causing cusp fracture, temporomandibular joint problems, difficulties in speech and mastication, malocclusion, esthetic, and periodontal problems. Early intervention of dental anomalies without causing deformity in the jaws and teeth is crucial, especially those found during the growth and development period [5–8].

The first permanent molar is the earliest tooth to be exposed to caries attacks in permanent dentition [9]. On the other hand, permanent first molars are seen as the key to occlusion. When uncontrolled permanent first molar extraction occurs, occlusion disorders, skeletal asymmetries, and temporomandibular joint disorders are reported [10,11].

Developmental dental anomalies are usually detected on routine clinical and radiological dental examinations. The most common dental anomalies are malformations in tooth structures, microdontia and macrodontia, hypodontia, oligodontia, and anodontia, supernumerary teeth, fusion and gemination, dilaceration, taurodontism, peg-shaped lateral incisor, talon cusp, dens evaginatus, and dens invaginatus [8,12]. Panoramic radiographs (PRs) have a lot of advantages such as providing the image of a

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large area with a low radiation dose and achieving the image within a short period. PRs are frequently used in the evaluation of dental development and in the identification of dental anomalies, especially in mixed dentition [13].

This study will be carried out to determine the frequency of anomalies in the society by retrospective evaluation of PRs taken during a routine dental examination. This study is going to determine the epidemic of dental anomalies in childhood in Aydin city and to draw attention to the early diagnosis and treatment of dental anomalies.

Material and Methods

This retrospective study consisted of 1,068 PRs obtained between 1 January, 2015 and 31 December, 2017 of children aged from 2 to 14 years who were referred to Aydin Dental Health Center. Adnan Menderes University Clinical Research Ethics Committee approved the study.

The patients were examined in two groups as 2–5 and 6–14 years old. The gender, age, early loss of permanent first molar teeth, and dental anomalies of the patients were obtained from the patient records and PRs. Radiographs with poor image quality were excluded from the study.

A pedodontist evaluated PRs in terms of number, size, shape, and structural dental anomalies. When confused in diagnosis, a consensus was achieved with an oral radiologist.

Statistical analysis

Data were analyzed using the statistical software package Statistical Package for the Social Sciences v22.0 (Armonk, NY, IBM Corp). Student's *t*-test and continuity (yates) correction were used for the analysis of age and gender ($p > 0.05$). To determine the relationship between categorical variables, Pearson's chi-square and Fisher's exact tests were carried out. $P < 0.05$ was considered statistically significant.

Results

A total of 1,068 PRs from 465 female and 603 male patients were evaluated in the study. The mean age of the patients was 9.07 ± 2.48. The age distribution of patients according to gender is presented in Table 1.

While 86 (8.5%) out of 1,068 patients had a dental anomaly, 49 (5.2%) out of 930 patients had an early loss of permanent first molar teeth (Figure 1).

The most common dental anomaly was missing teeth (51%–4.8%) (Figure 2). After missing teeth, impacted teeth (14%–1.3%) were the most common dental anomaly (Figure 3). The distribution of dental anomalies and early loss of permanent first molar teeth are presented in Table 2.

There was no statistically significant difference among various dental anomalies and the gender of the participants ($p > 0.05$). Details of the participants' gender and dental anomalies are presented in Table 3.

The early loss of permanent first molar was more common in females than in males, and this

Table 1. Gender and age distribution of the patients.

	N	Mean	SD
Total	1,068	9.07	2.48
Male	465	9.13	2.45
Female	603	9.03	2.50

Student's *t*-test.

Table 2. Distribution of dental anomalies.

N	Dental anomaly	*n* (%)
1,068	Supernumerary teeth	1 (0.1%)
	Missing teeth	51 (4.8%)
	Microdontia	5 (0.5%)
	Infraocclusion	7 (0.7%)
	Ectopic eruption	2 (0.2%)
	Odontoma	4 (0.4%)
	Fusion	1 (0.1%)
	Gemination	1 (0.1%)
	Impacted teeth	14 (1.3%)
	Ankylosed deciduous teeth	3 (0.3%)
930	Early loss of permanent first molar	49 (5.2%)



Figure 1. A 13 year old female patient with an early loss of permanent molar teeth.



Figure 2. A 9 year old woman patient with 2nd missing premolar teeth.



Figure 3. A 9 year old woman patient with impacted tooth number 35.

Table 3. Association of the participants' gender and dental anomalies.

Dental anomaly	Gender		Chi-square	*p*-value
	Male *n* (%)	Female *n* (%)		
Supernumerary teeth				
Present	0 (0.0%)	1 (100.0%)	0.772	1.000
Absent	465 (43.6%)	602 (56.4%)		
Missing teeth				
Present	16 (31.4%)	35 (68.6%)	3.225	0.073
Absent	449 (44.1%)	568 (55.9%)		
Microdontia				
Present	0 (0.0%)	5 (100.0%)	3.874	0.072
Absent	465 (43.7%)	598 (56.3%)		
Infraocclusion				
Present	2 (28.6%)	5 (71.4%)	0.642	0.705
Absent	463 (43.6%)	598 (56.4%)		
Ectopic eruption				
Present	2 (100.0%)	0 (0.0%)	2.598	0.189
Absent	463 (43.4%)	603 (56.6%)		
Odontoma				
Present	3 (75.0%)	1 (25.0%)	1.617	0.323
Absent	462 (43.4%)	602 (56.6%)		
Fusion				
Present	1 (100.0%)	0 (0.0%)	1.298	0.435
Absent	464 (43.5%)	603 (56.5%)		
Gemination				
Present	1 (100.0%)	0 (0.0%)	1.298	0.435
Absent	464 (43.5%)	603 (56.5%)		
Impacted teeth				
Present	9 (64.3%)	5 (35.7%)	2.484	0.115
Absent	456 (43.3%)	598 (56.7%)		
Ankylosed deciduous teeth				
Present	1 (33.3%)	2 (66.7%)	0.127	1.000
Absent	464 (43.6%)	601 (56.4%)		

Chi-square tests, Fisher's exact test.

difference was statistically significant ($p < 0.05$, $\chi^2 = 4.171$). The association of the participants' gender and early loss of permanent first molar are presented in Table 4.

Discussion

Dental anomalies may lead to various functional and esthetic oral health problems. Caries, chewing problems, poor oral hygiene, orthodontic problems, and cystic formations are some of them [7,8,12]. In addition, multiple dental anomalies may be a sign of some syndromes such as Cleidocranial dysplasia, Gardner's syndrome, Ectodermal dysplasia, Papillon–Lefévre syndrome, and Rubinstein–Taybi syndrome [14–16]. Therefore, determining the frequency and distribution of dental anomalies is essential to prevent oral health problems and to detect related syndromes early.

The frequency of dental anomalies was found as 8.5% in the present study. There were various frequency rates of dental anomalies in the literature. Although Erkmen Almaz et al. [17] reported the frequency of dental anomalies as 1.8%, Cholitgul and Drummond [18] reported a 21%. While Temilola et al. [7] reported a 26.6% frequency of dental

Table 4. Association of the participants' gender and early loss of permanent first molar.

	Gender		Chi-square	*p* value
	Female *n* (%)	Male *n* (%)		
Presence of early loss of permanent first molar	34 (69.4%)	15 (30.6%)		
Absence of early loss of permanent first molar	480 (54.5%)	401 (45.5%)	4.171	**0.041**
Total	514 (55.3%)	416 (44.7%)		

Chi-square tests, Fisher's exact test.

anomalies, Goutham et al. [3] reported a 35.3% and Škrinjarić and Barac-Furtinović [19] reported a 1.0%. These differences may result from sample selection, methodology, the total number of participants, and the region where the study was carried out.

Temilola et al. [7] reported the most prevalent anomaly as hypoplastic enamel (16.1%), and this is followed by dens evaginatus (6.4%) and macrodontia (2.0%). According to Goutham et al. [3], the most prevalent dental anomaly was dilaceration (46.71%), followed by peg laterals (20.99%) and missing teeth (4.07%). The distribution of dental anomalies was quite different in various regions of Turkey. The most common dental anomalies in this study were missing teeth (4.8%), impacted teeth (1.3%), and infraocclusion (0.7%). Namdar-Pekiner et al. [6] reported the most frequent anomaly as impacted tooth (15.78%), missing tooth (11.82%), and supernumerary tooth (3.94%). There were 3.50% mesiodentes, 1.89% fusion, and 1.52% impacted tooth according to Namdar-Pekiner et al. [6]. The most frequently observed anomalies were missing teeth (0.52%), supernumerary teeth (0.27%), and molar–incisor hypomineralization (0.25%) according to Erkmen Almaz et al. [17]. These findings can point out that genetic and environmental factors will be related to the distribution of dental anomalies.

Gender predisposition was not determined in any of the dental anomalies evaluated in our study in accordance with the studies of Bekiroglu et al. [5] and Chen et al. [20]. Temilola et al. [7] also reported that there was no gender predilection in the prevalence of the anomalies, except for macrodontia. On the contrary, Whittington and Durward [21], Skrinjarić and Barac-Furtinović [19], and Ezoddini et al. [22] declared male predilection for the occurrence of dental anomalies.

Permanent first molar teeth play a key role in the establishment of permanent occlusion, contribute significantly to the chewing function, and act as a guide for the maintenance of other teeth [10,23]. However, as a result of uncontrolled extractions of permanent first molars in the period of growth and development, tilting, displacements, and opposing back elongations can be seen. As a result of unilateral extractions; midline deviations, lengthening of the opposite tooth, skeletal and dental asymmetry, unilateral chewing habits, and temporomandibular joint disorders may occur. The clinician should follow each case for the need of balancing or compensating extractions to preserve the dental midline and prevent overeruption [10,23,24].

This study has some limitations. It is a retrospective study that depends on radiographic evaluation. When clinical and radiological examinations are used together, they can precisely determine the frequency of dental anomalies in the community. With the correct diagnosis of these dental anomalies, complications in the normal functioning of orofacial complex and esthetic appearance (temporomandibular joint problems, difficulties in speech and mastication, malocclusion, esthetic, and periodontal problems) can be prevented. The identification of the frequency of these anomalies helps physicians to obtain a proper treatment plan. PRs are useful to detect dental anomalies and to plan an appropriate treatment approach in children.

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