

Prevalence and Pattern of Congenital Missing Teeth in a Group of Iranian Adolescents

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KEY WORDS

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ABSTRACT

Statement of Problem: Congenital missing tooth is the condition of having genetically one or more missing teeth which cannot be observed clinically or in radiographic images. This is one of the most prevalent anomalies in dental development that occurs either individually or as symptoms of a syndrome. Moreover, for permanent teeth, it is common with a reported prevalence of between 1.6-9.6%.

Purpose: The aim of this study was to assess the prevalence rate and the pattern of congenital missing teeth in adolescents referring to Mashhad School of Dentistry.

Materials and Method: In this cross-sectional study, a total of 600 panoramic radiographs related to the subjects aged 9-14 years (351 girls and 249 boys) were analyzed. The data were recorded in the related forms, and then analyzed using Chi-square and Exact tests.

Results: Among 600 panoramic radiographs, 94 teeth were found to be missing. The most and the least frequent missing teeth were the mandibular second premolars and the maxillary central incisors (observed in only 1 subject), respectively. The most commonly absent teeth were the mandibular second premolars, the maxillary lateral incisors, the mandibular central incisors, and the maxillary second premolars in order of the frequency.

Conclusion: This study revealed that the frequency of missing tooth in girls is higher than that in boys. Thus, due to the girls' more aesthetic sensibility and also intricate treatment of such anomaly, accurate and frequent examination of adolescents' particularly girls' teeth for on-time diagnosis is crucial.

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Introduction

A tooth is considered as missing when it can be observed neither clinically nor in radiographic images, and also when no history of extraction exists [1]. In general, the primary and permanent teeth are clinically visible at the age of 3 and 12-14, respectively

[1]. The missing teeth cause disturbance in the developing occlusion, masticatory and verbal dysfunctions, and affects aesthetics. Therefore, a group of related specialists are required to cure such cases [2].

The etiology of missing teeth, however, is not fully clear. Nevertheless, it seems that a congenital

missing tooth is strongly controlled by genes, and is associated with various syndromes [2]. There is a high correlation between the absence of primary and permanent teeth [3]. Generally, panoramic radiography and clinical examination are the best ways to diagnose the missing teeth. Except the third molars that can be diagnosed after the age of 10, the absent permanent teeth can be diagnosed after 6 years old [1]. Chung reported the second premolars and the mandibular lateral incisors as the most frequent absent teeth. Assessing dental casts, panoramic radiographs, and lateral cephalograms, they also concluded that hypodontia in class III malocclusion is more prevalent than in malocclusion class I and II [4].

In a study by Creton et al., the most prevalent absent maxillary teeth were shown to be the premolars and the lateral incisors, and among the mandibular teeth, the second premolars or both premolars were more common to be absent. They have also shown that oligodontia occurs heterogenetically [5]. Another study by Cobourne concluded that having genetically absent teeth is characterized by growth and development anomalies which is one of the most common developmental anomalies [6].

Goren reported tooth agenesis with the prevalence of 5.3%; the investigation also represented the mandibular second premolars and the maxillary lateral incisors as the most frequent absent teeth [7]. However, Sliva Meza confirmed that absence of the maxillary lateral incisors and the mandibular second premolars were the most common, respectively [8]. On the other hand, Nordgarden found the mandibular second premolars, the maxillary second premolars, and the maxillary lateral incisors to be the most commonly absent teeth, respectively [9]. The missing teeth may cause mastication and occlusal disturbance as well as aesthetic dissatisfaction [2]. Hence, on-time diagnosis could assist in making an effective treatment and preventing the complicated problems.

This study was conducted to determine the prevalence and the pattern of congenital missing

teeth using radiography, in 9 to 14-year-old adolescents referring to Mashhad School of Dentistry, Iran.

Materials and Method

This study was conducted on 600 adolescents referred to Mashhad School of Dentistry. The adolescents had also taken panoramic radiograph for their dental treatments. The age range of the subjects was considered to be 9-14 years old since the absence of tooth in some tooth types such as the third molar cannot be diagnosed before the age of 9 and since by the age of 14, either permanent tooth germs (excluding wisdom tooth) are observable in radiographs or are erupted in the mouth. The sample size was estimated at 600 based on the formula, incidence of 10%, and relative accuracy of 25% [10]. Ethics committee of Mashhad University of Medical Sciences approved this research (# 286252). The variables included gender, age, and the location of the tooth in jaws.

After an interview with the adolescents and their parents, a questionnaire was completed for each one. It included questions regarding having particular diseases such as cardiovascular or blood diseases and taking related medicines as well as having any history of tooth extraction, and trauma. Then, the subjects' mouths were examined using a mirror and explorer by a senior dentistry student under supervision of the main researcher and a supervisor. The tooth that was not observed in the clinical examination and also the tooth germ that was not shown in the related radiograph were considered and recorded as missing.

Data analysis was performed by using Exact and Chi-square tests in SPSS software (13, SPSS Inc., Chicago Ill, USA). The Chi-square test was applied to investigate the relationship between quantitative variables.

Results

The panoramic radiographs related to 600 adolescents, 351 girls (58.5%) and 249 boys (41.5%) referring to Mashhad School of Dentistry in 2008, were

examined in this study. The mean age of the subjects was 10.63 ± 1.66 years. Of the 600 examined radiographs, a total of 94 teeth were found to be absent. The prevalence of congenital missing teeth was found to be 0.097%. About 17 (2.7%) and 21 (3.3%) teeth were realized as missing on the maxillary right and left sides, respectively. Also, 26 (4.3%) and 30 (4.8%) missing teeth were found on the mandibular right and left sides, respectively. However, there was no significant difference among the jaw quadrants in the number of missing tooth ($p = 0.148$)

Nevertheless, the prevalence of missing teeth (5.1%) on the left side of the mandible in girls was shown to be higher than in boys. In addition, boys showed a higher prevalence (4.4%) of missing teeth on the mandibular and maxillary left side, compared to the right side. The number of missing teeth was 38 and 56 in boys and girls, respectively (Table 1). There were no significant differences in the missing teeth between girls and boys ($p = 0.84$). Absent teeth in the boys were listed as the mandibular second premolars, the mandibular central incisors, and the maxillary lateral incisors, respectively. Moreover, the order of the absent teeth in girls was almost similar to that of boys and the most prevalent missing teeth for girls were recorded as the mandibular second premolars and the maxillary lateral incisors.

Table 1 Distribution of congenital missing teeth based on sex and jaw quadrant in adolescents referring to Mashhad School of Dentistry

Quadrant	Sex		
	Male (%)	Female (%)	Total (%)
maxillary right	6 (15.8)	11 (19.7)	17 (2.7)
maxillary left	9 (23.7)	12 (21.4)	21 (3.3)
mandibular right	12 (31.6)	18 (32.1)	30 (4.8)
mandibular left	11 (28.9)	15 (26.8)	26 (4.3)
Total	38 (100)	56 (100)	94 (3.8)

In the present study, the most frequent absent tooth was the mandibular second premolars, and next were the maxillary lateral incisors, the mandibular central incisor, and the maxillary second

premolars. None of the teeth number 3, 6, and 7 was absent.

Furthermore, distribution of the number of missing tooth in different jaw quadrants was shown to be similar in both genders; however, the most frequent missing teeth were generally located at the left side of the mandibular jaw. Among the 54 subjects suffering from congenital missing teeth, 28 (13 boys and 15 girls) adolescents involved one-sided and 26 (10 boys and 16 girls) more than one-sided missing, with no statistical difference between boys and girls ($p = 0.55$). In general, double-sided missing was more prevalent in the mandibular second premolars, and it was more common among the girls than boys. However, there was no statistical difference between boys and girls in the type of missing teeth ($p = 0.08$) Table 2.

Table 2 Distribution of missing teeth in understudied population based on tooth type and sex in adolescents referring to Mashhad School of Dentistry

Tooth type	Male (%)	Female (%)	Total (%)
Central	10 (26.3)	6 (10.7)	16 (11.5)
Lateral	9 (23.7)	16 (28.6)	25 (18)
First premolar	3 (7.9)	1 (1.8)	4 (2.9)
Second premolar	16 (42.1)	33 (59.6)	49 (67.6)
Total	38 (100)	56 (100)	94 (100)

Discussion

This research was conducted on 600 panoramic radiographs related to 351 girls and 249 boys aged between 9 to 14 years, who referred to Mashhad School of Dentistry, Iran. The radiographs were evaluated to assess the prevalence rate and the pattern of congenital missing teeth. The prevalence of missing teeth in girls was slightly higher than that in boys, with no significant difference, similar to the other investigations [3, 11]. Comparing the left and right sides of the maxilla and mandible, there was no statistical difference between the missing teeth and the jaw quadrant ($p = 0.148$). Yet, the prevalence of the absent teeth was higher in the mandible and on the left side of the jaws.

Endo announced that missing tooth pattern was similar on the right and left sides of the dental arches

in Japan [12]. Albashaireh in Jordan found no significant difference between the location of missing teeth in arches and the pattern of hypodontia [13]. Further-more, Kirzioglu in Turkey realized that absent tooth is more common in the mandible and on the right side of the mandible, consistent with no difference [14]. These findings are similar to those of the present study.

In this study, the most and the least frequent missing teeth were the second mandibular premolars and the maxillary central incisors (observed in only one subject), respectively. Similarly, Albashaireh in Jordan [13], Goren in Palestine [7], Maatouk in Japan [15] and Cholitgul in New Zealand [16] reported the second mandibular premolars and then the maxillary lateral incisors as the most common absent teeth. However, Silva Meza in Mexico showed the absence of the third molars and next the maxillary lateral incisors and the second mandibular premolars to be the most frequent ones. This was due to inclusion of the third molars; also ethnic origins should be considered [8].

In contrast, Davis found the mandibular incisors to be the most absent teeth [17]. Khanemasjedi [18] showed the maxillary lateral incisors as the most common missing tooth in Ahwaz, Iran, with the prevalence of 35.8%. The difference between his study and ours in terms of the type of missing teeth can be considered as the difference between ethnic origins and study methods. Moreover, the present study was conducted more precisely because the subjects were those who referred to Mashhad School of Dentistry and also clinical and radiographic diagnoses as well as history of patients were analyzed. Among 54 adolescent with congenital missing teeth, 28 involved one-sided and 26 more than one-sided missing pattern, consistent with no statistical difference that was similar to other studies [14].

Conclusion

The finding revealed that the most frequent missing tooth was the mandibular second premolars in double-sided missing pattern. Moreover, the

prevalence of missing teeth was more common in girls than boys. Because absent teeth may cause problems in mastication, occlusion, aesthetics, and speaking, on-time diagnosis would accelerate treatment process and prevent the following problems.

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