

## Investigation Of Early Loss Of Permanent Teeth in Patients Among the Age Of 10-25

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### Abstract

**Objective:** It is aimed to identify the prevalence of permanent missing teeth in patients between the ages of 10-25 and to emphasize the importance of early diagnosis and treatment planning.

**Material and Methods:** The radiographs of patients who applied to the Department of Oral and Maxillofacial Radiology of Fırat University Faculty of Dentistry and had panoramic radiography taken for various reasons were evaluated retrospectively. Radiographs of 1879 patients (1037 women, 842 men) aged between 10-25 were included in the study. Permanent missing teeth were examined according to number, location and gender. In addition to descriptive methods (mean, standard deviation, frequency), Chi-square test and one-sided chi-square test were used to compare qualitative data. Significance was evaluated at  $p < 0.05$  level.

**Results:** In 1879 panoramic radiographs, 569 missing permanent teeth were detected in 299 patients (175 women, 124 men). The prevalence of permanent missing teeth was found to be 15.9% (16.9% in women, 14.7% in men). The most common missing teeth are: lower first molar, lower second premolar and upper lateral incisor. The prevalence of permanent tooth deficiency was higher in the mandibula than in the maxilla, and a statistically significant difference was obtained. In addition, among patients with missing teeth, the rate of patients with only one missing tooth was found to be 48.2%.

**Conclusion:** The most common missing permanent tooth was found to be the lower first molar in our study. This was followed by the lower second premolar and the upper lateral incisor, respectively, and the least missing tooth was the lower canine. The most missing teeth were in the mandible. No significant difference was observed between genders.

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**Keywords:** Hypodontia, Congenital tooth deficiency, Permanent tooth deficiency

### Introduction

Tooth development, which begins with the interaction between epithelium and mesenchyme in intrauterine life, is a complex process that progresses through a series of stages (1). Although the etiology of missing teeth is not fully clarified, it depends on many factors such as caries, periodontal diseases, infections, trauma, radiotherapy, chemotherapy, orthodontic

treatment, systemic diseases, genetic factors, and syndromes (2, 3).

MSX, PAX9, TGFA etc. gene mutations are associated with congenital tooth deficiency and different rates of tooth deficiency are encountered in different ethnic groups. In addition, in societies with low socio-economic levels, the increase in dental infections and periodontal diseases due to inadequate oral and dental health equipment and difficulty in accessing them brings about acquired tooth loss (4, 5, 6).

Since tooth deficiency causes asymmetry in the upper and lower jaw, it leads to disruption of the harmony between facial and dental structures (7).

Early extraction of permanent teeth negatively affects both arches and the entire occlusion, leading to early contacts and shifting of the midline towards the extraction site (8). The missed tooth socket is closed primarily and especially by the mesial movement of the posterior teeth and partially by the distal movement of the anterior teeth. Rotational movement occurs in the upper jaw as the posterior group of teeth slide mesially and this movement causes crossbite in the posterior region. In the lower jaw, more tipping is observed in the teeth adjacent to the extraction area, significant early contacts and horizontal displacement occurs in the lower jaw. These effects can cause dentofacial asymmetries and TMJ problems (9, 10). It is known that early and unilateral loss of permanent teeth causes asymmetry by causing changes in chewing habits and muscle structures (9, 11).

In order to prevent many dentofacial problems caused by the loss of permanent teeth in the early stage, treatment planning should be made by evaluating factors such as the patient's age, tooth development status, presence of crowding, degree and class, which jaw the tooth will be extracted from, occlusal relations and congenital tooth deficiency.

Early diagnosis of caries before they cause premature loss of permanent teeth and treatments which appropriate to patient's needs and prevention of possible occlusal disorders play a key role in establishing a normal occlusion and ensuring aesthetics and function. In the light of this information, we can conclude that early loss of permanent teeth is one of the most undesirable situations in dentistry.

It is aimed to evaluate the early loss of permanent teeth and loss rates of individuals between the ages of 10-25 according to gender and location.

## Material and Methods

Panoramic radiographs of 2000 patients who applied to Firat University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology clinic due to several reasons were evaluated retrospectively. 1879 (1037 women and 842 men) radiographs that met the study criteria were included. Permanent third molars and 121 radiographs with poor image quality were not included. Radiographs were received from a Planmeca ProMax (Planmeca OY, 00880 Helsinki, Finland) panoramic

radiography device with exposure settings of 10 mA, 85 kVp and 14 s.

The images were evaluated by a pedodontist and radiologist with 5 years of experiences. Permanent tooth deficiencies were recorded according to number, gender and location. Ethical approval was obtained from Firat University Non-Interventional Clinical Research Ethics Committee (22.10.2018 -18/06) for this study. During the evaluation of the results, IBM SPSS Statistics 22 (IBM SPSS, USA) program was. In addition to descriptive methods (frequency, mean, standard deviation), Chi-square and one-sided chi-square tests were used to compare qualitative data. Significance was evaluated at  $p < 0.05$  level.

## Results

This research was performed on a total of 1879 patient, 842 (44.8%) men and 1037 (55.2%) women, aged between 10-25 years. The average age was  $17.61 \pm 2.172$ . Missing teeth were detected in 299 (15.9%) of the patients. Missing teeth were reported in 14.7% of men and 16.9% of women. The total of missing teeth was 569 (Table 1).

**Table 1: Prevalence of missing teeth according to gender**

	Missing Teeth		p
	Absent n (%)	Present n (%)	
Men	718 (%85,3)	124 (%14,7)	0,205
Women	862 (%83,1)	175 (%16,9)	

The number of missing teeth varied between 1 and 12 and the average was found to be  $1.90 \pm 1.45$ . The prevalence of one missing tooth was 48.2%, two missing teeth was 35.8%. The prevalence of one or two missing teeth was 84% (Table 2).

**Table 2: Distribution of the number of missing teeth**

Number of missing teeth	n	%
1 tooth missing	144	48,2
2 teeth missing	107	35,8
3 teeth missing	24	8

4 teeth missing	12	4
6 teeth missing	4	1,3
7 teeth missing	3	1
8 teeth missing	3	1
10 teeth missing	1	0,3
12 teeth missing	1	0,3

Of the total 569 missing teeth, 347 (61%) were in the mandibula and 222 (39%) were in the maxilla; the prevalence of missing teeth in the mandibula was found to be significantly higher than in the maxilla ( $p:0.001$ ;  $p<0.05$ ) (Table 3).

**Table 3: Prevalence of missing teeth according to the jaws**

	Missing Teeth		p
	n	%	
Maxilla	222	39,0	0,001*
Mandibula	347	61,0	
Total	569	100	

While permanent tooth loss was mostly seen in the lower first molars (27.1%,  $n = 154$ ), it was followed by the lower second premolars (17.4%,  $n = 99$ ) and upper laterals (12.3%,  $n = 70$ ) (Table 4).

**Table 4: Distribution of missing teeth according to tooth groups**

Tooth groups	n	%
Upper centrals	8	1,4
Upper laterals	70	12,3
Upper canines	3	0,5
Upper 1.Premolars	46	8,1
Upper 2.Premolars	23	4
Upper 1.molars	54	9,5
Upper 2.molars	18	3,2
Lower centrals	25	4,4
Lower laterals	17	3
Lower 1.premolars	23	4
Lower 2.premolars	99	17,4
Lower 1.molars	154	27,1
Lower 2.molars	29	5,1
Total	569	100

## Discussion

The problem of missing teeth are still one of the biggest dental problems despite intensive strategies for prevention. In the literature, the prevalence of permanent missing teeth varies between 2.2% and 36.5%. Factors such as differences in evaluated age groups, examination methods, geography, race and gender ratios are shown as the reasons for this variability (3, 12).

The prevalence of missing teeth, which can also be defined as hypodontia, is reported as 11.2% in Korea (13), 8.5% in Japan (5), 6.3% in Brazil (14), 10.9% in Iran (6), and studies in different regions in Turkey it was reported as 6.77% in Konya (15), 7.9% in Izmir (3), and 8.5% in the Black Sea region (2). Although the rate of permanent tooth deficiency in our study was found to be consistent with the literature; there are also quite different results in the literature.

There is no complete consensus in the literature regarding the location of the most common missing tooth. In some studies, it was reported that the most common missing tooth was the lower second premolar (3, 5, 6, 12, 16), in some it was the upper lateral (14, 17, 18), and in others it was reported that the lower first molar which is in parallel with our study (1, 19, 20). In a study carried out in China, the most common missing tooth was the lower incisor (21) and in the study by Topkara and Sarı, when the third molars were included, the most frequently missing tooth was the third molar (15).

In general, the effect of gender on hypodontia is not fully understood. While some studies found a higher rate of tooth loss in women (12, 17), some studies found a higher rate of tooth loss in men (22). In some studies, no significant difference was found between genders which parallel to our study (5, 14, 16, 23, 24).

In our study, the rate of missing teeth in the lower jaw was found to be higher than in the upper jaw, and some researchers found the rate of missing teeth to be higher in the mandibula, similar to our study (25, 26). There are also studies that found the rate of missing teeth to be higher in the maxilla (4,

14). In addition, in the study of Tunç and Koyutürk, the rates of missing teeth in the lower and upper jaw were found to be similar (2).

The rate of patients with only 1 or 2 missing teeth was 86.9% in Fekonja's study and 84.5% in Candan et al.'s study (3, 27). Our study is also consistent with these studies.

In the study of İncebeyaz et al., which they investigated missing teeth in different age groups, the prevalence of missing teeth in the group between the ages of 7-15 was found to be 7.2% and it was reported that this rate increased with age. Also it was found that the prevalence of missing teeth were quite similar between genders and the missing lower first molar (43.9%) was more common than the upper first molar (38.6%). Researchers have associated this situation with the earlier eruption of lower first molars compared to other permanent teeth (28).

In the study of Günal and Bozkurt, 84 permanent teeth extracted from 1536 patients between the ages of 0-16 who applied to the surgery clinic: 34 lower molars (40.4%), 18 upper premolars (21.4%), 17 upper molars (20.2%), 2 lower incisors (2.3%) and 13 lower premolars (15.4%) were reported and early tooth loss was found to be more common in the mandible than in the maxilla. Researchers explained the reason for this situation that mandibular first molars are the teeth which most exposed to the oral environment and most prone to loss among permanent teeth (20).

In the study conducted by Olatosi and Sote with 493 patients between the ages of 1-16, the patients were grouped as primary, early mixed, late mixed and permanent dentition. The most common causes of tooth loss in the 9-12 and 13-16 age groups were: caries, orthodontic treatment, trauma and failure of previous treatment, respectively. It has also been reported that the first molar is the most commonly lost tooth in the permanent dentition period (1).

George et al. reported that the most common missing teeth in the maxilla and mandible are teeth 26 and 46 respectively; the least missing teeth were teeth numbered 23 and 33, similar to our study (19).

Murray et al. found that 86% of tooth extractions in children under the age of 12 were for orthodontic indications. This shows that extractions performed for orthodontic treatment are an important cause of missing teeth (29).

## Conclusion

The most common missing permanent tooth was found to be the lower first molar in our study. This was followed by the lower second premolar and the upper lateral incisor, respectively, and the least missing tooth was the lower canine. The most missing teeth were in the mandible. No significant difference was observed between genders. Since our study was a retrospective study, the cause of permanent tooth loss could not be determined. More comprehensive studies to determine the causes of tooth loss will contribute to the development of new measures, treatments and health policies to prevent tooth loss and its complications.

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