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Evaluation of Permanent First Molar Tooth Loss in Young Population from North Turkey

SUMMARY

Background/Aim: *Rate of missing permanent teeth in a population is important for oral health indicators. The aim of this retrospective study was to evaluate the prevalence of previously missing permanent first molar (PMF) teeth in a young population.* ***Material and Methods:*** *1204 healthy patients who received panoramic radiographs were selected randomly at their first visiting to Samsun Ondokuz Mayis University Faculty of Dentistry. The patients' age ranges were 7 to 17. Information about extracted permanent first molar teeth, missing regions, patients' ages, and genders was recorded. The data were statistically analyzed using chi-square tests.* ***Results:*** *1,204 patients, of these, 608 (51%) were female, and 596 (49%) were male. 4,816 PFM teeth were evaluated in this study, and 128 of them (2.66%) had extracted from 97 different patients. There were statistically differences between groups in terms of age and gender ($p<0.05$). It was observed that mandibular teeth were more frequently extracted than maxillary ones, and lower left permanent first molar teeth had more extracted than the others.* ***Conclusions:*** *The first permanent molar teeth could be extracted different reasons. However, these teeth should be protected by both dentists and patients.*

Key words: Age, Child, Permanent First Molar, Tooth Extraction

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Introduction

Oral health care is part of general health, and it is considered essential to an individual's quality of life. Therefore, tooth loss is considered a public health problem[1,2]. Dental health programs are aimed to decrease dental plaque, tooth decay, periodontal disease and loss of teeth[3]. Although many alternative practices have been developed to protect oral health, early tooth loss is still a big problem[4].

Permanent first molar (PFM) teeth are the first developing permanent teeth in posterior region. However, permanent first molar teeth have been characterized as most caries-prone teeth in the mixed dentition[5]. Additionally, 10-19% of PFM teeth were hypo-mineralization[5,6]. Consequently, PFM teeth may be lost at an early age. Other reasons for PFM teeth loss were poor prognosis, caries, orthodontic reasons and periodontal diseases[7].

Early extraction of PFM teeth may cause undesirable rotation and mesial drifting of secondary permanent molars[8]. PFM teeth play an important role in balanced and normal occlusion[9]. Because of this, early extraction of PFM may affect whole occlusion and development of both jaws. Additionally, asymmetry and temporomandibular joint problems may be observed[8,10]. For making a decision about extraction of PFM, dental pain, excessive material loss, parental attitudes and toleration of dental treatment may affect indication. All conditions, in the developing dentition, should be assessed before extraction of PFM teeth[11].

In the present retrospective study was evaluated prevalence of missing permanent first molar teeth in young patients first admitted to Ondokuz Mayis University, Pediatric Dentistry Clinic for examination.

Material and Methods

This study was performed in the north region of Turkey (Middle Black Sea Region). Ethics approval was obtained from the Ethics Committee of Medical Research of Ondokuz Mayis University, Samsun, Turkey (2015/02). This study was performed in Ondokuz Mayis University, Faculty of Dentistry, and included 1,204 healthy patients (608 females and 596 males) who were admitted for the first time to Pediatric Dentistry Clinic for a routine dental control at first quarter of 2012. The patients' age ranges were 7 to 17, and they had received panoramic radiographs. Patients with edentulism due to a systemic disease were excluded from the study. Demographic information was recorded, including age and gender. Extracted PFM teeth, jaws, right or left side of the oral cavity were determined from panoramic radiographs. Extraction required teeth were not recorded. The data were collected retrospectively by the same physician.

Statistical analyses were performed using SPSS version 22.0 (SPSS Inc., Chicago, IL, U.S.A.). All data were evaluated as frequency and percentage. Chi-square tests were used to compare relative differences in extracted PFM, gender, age and jaws. P<0.05 was accepted as statistically significant in comparisons.

Results

In all, 1,204 patients were assessed. Of these, 608 (51%) were females, and 596 (49%) were males (p>0.05). It was determined that 128 PFM teeth (2.66%) from a total of 4,816 had been extracted from 97 (8%) of 1,204 patients. Seventy patients had only one PFM tooth loss, 23 patients had two, and four patients had three missing PFM teeth. No patient had four missing PFM teeth. The distributions by age, gender, and extracted first molar in the subjects are summarized in Table 1 and Table 2.

Table 1. Distributions of patients according to age and gender

	Female Extraction		Male Extraction		Total Extraction	
Age	Yes*	No	Yes*	No	Yes*	No
7	0	49	0	70	0	119
8	1	64	1	64	2	128
9	0	75	1	88	1	163
10	1	46	2	58	3	104
11	2	45	6	42	8	87
12	7	43	1	35	8	78
13	8	62	11	67	19	129
14	12	47	4	51	16	98
15	14	61	8	43	22	104
16	11	53	4	38	15	91
17	3	4	0	2	3	6
Total	59	549	38	558	97	1107
	608		**596**		**1204**	

*The number of patients having at least one first molar tooth loss

Table 2. The number of extracted first molar tooth

Age	7	8	9	10	11	12	13	14	15	16	17	Total
Female	0	1	0	1	3	9	11	18	16	15	5	79
Male	0	1	1	3	10	1	13	5	10	5	0	49
Total	0	2	1	4	13	10	24	23	26	20	5	128

Considering the number of extracted teeth, gender, age and region of jaws were all statistically significant (p<0.05). There was 49 (2.05%) extracted PFM teeth from 38 males and 79 (3.25%) extracted PFM from 59 females (p<0.05) (Figure 1).

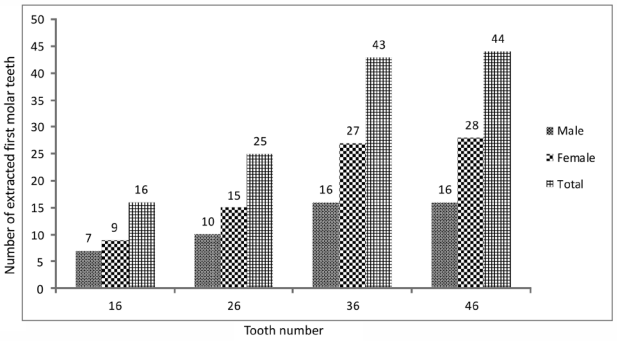

Figure 1. Distribution of the age and extracted PFM according to age and tooth number

Distribution of extracted PFM teeth according to the jaws and sides was showed in Table 3. There was statistical difference between the jaws but no in the sides.

Table 3. Distribution of extracted PFM in the jaws and sides

Categories	N (%)	P value
Jaw		
Maxilla	87 (68%)	p<0.05
Mandible	41 (32%)	
Side		
Right	68 (53%)	p>0.05
Left	60 (47%)	

Discussion

For a long time, extraction of PFM has been subject to debate. The extraction of PFM should be planned with an orthodontist before the eruption of second and third permanent molars. In recent years, orthodontists have favored extraction and also have given indications for extraction of PFM[12,13]. Pediatric dentists have to perform complicated fillings that result in excessive material loss in children who have dental anxiety and behavior-management problems[14,15]. Also, these molar teeth must be kept in the mouth for preventive reasons. Sometimes, orthodontists may want to preserve these teeth because of orthodontic procedure[13]. Consequently, it is difficult

to decide about PFM tooth extraction. Therefore, in the present study, only the frequency of extracted PFM teeth was investigated.

Despite the researches, early tooth loss is still a big problem, especially since the early loss of permanent first molars plays a key role in the asymmetry of dentition[4,8,10]. Therefore, determination of the number of patients with early loss of permanent first molars in the community will be beneficial. In the present study, although many cases required tooth extraction etiologically, only extracted first molar teeth were investigated. In this study, the number of previously extracted permanent first molars was 128 (2.66%) of 4,816 PFM teeth in 97 (8%) of 1,204 patients. The data were compared with previous studies[16-18].

Alves *et al.*[16] performed a study among 12-year-old schoolchildren from South Brazil. The researchers observed that tooth loss rate in 1,528 patients were 5.81%. This rate was lower than in this study (8%) because they included only patients who were 12 years of age. George *et al.*[17] reported that rates of all missing permanent teeth in children and young people of 6, 12 and 15 ages were 5.7% 22% and 28.3%, respectively. These rates were higher than in this study because they had included all permanent teeth. Atieh[19] reported that the rate of teeth loss in 484 patients aged 14-19 were 40.9% (198 patients). This rate was higher than in this study because they had included all permanent teeth. Demirbuga *et al*.[18] performed a study on 31,580 permanent first molar teeth from 7,895 patients' panoramic radiography, and reported that missing teeth rates from 19,488 teeth in 6-11 age groups were 0.47% (122) and in 12-16 age groups from 12,092 teeth were 4.14% (501). These results were very similar to the results in this study.

Several studies[17,18,20] determined that gender may influence tooth loss, which agrees with findings of present study. Demirbuga *et al.*[18] reported that of the 15,008 teeth examined in the boys' group, 1.84% (276) were missing, and in the girls' group, of 16,572 teeth, 347 (2.09%) teeth were missing. George et al.[17] determined that tooth loss rates in males (42.9%) were lower than in the females (47.9%). Barbato and Peres[20] claimed that this finding could be explained by the fact that females use more dental services due to their deeper health or aesthetic concerns, which may lead to overtreatment. On the contrary, Bhat *et al*.[21] reported that the percentages of extracted teeth in males were 53.1% and in females were 46.9%. Jafarian and Etebarian[7] assessed that males comprised 48.7% of patients, but they had more extracted teeth (56.1%) than females (43.9%). On the other hand, Susin *et al.*[22] claimed that tooth loss was affected more by the age factor than by gender. They stated that the prevalence of tooth loss increased markedly with age from 26% to 60% in the age groups 14-19 and 25-29 years, respectively[22].

Some studies stated that most missing teeth were in the mandibular[20,21] . Bhat *et al*.[21] determined that the rate of missing mandibular first molar teeth was 21%, while the rate of missing maxillary first molar teeth was 10%. Barbato and Peres[20] showed that most missing teeth in jaws were mandibular first molars. Demirbuga et al.[18] reported that rates of missing permanent first molar teeth in mandibula were 2.77% (438) and 1.17% (185) teeth in maxilla. In the present study, the number of extracted PFM teeth in the lower arch was 87 and in the upper arch was 41. This situation can be explained by several factors. One of them is that more nutrients remain in the lower jaw than upper. Others are early eruption of mandibular teeth, caries, increased hypomineralization level, different effects of saliva and different anatomical structures of the teeth.

In the literature, there is limited information about early missing teeth on the left and right sides of the oral cavity in pediatric patients[18]. It was claimed that hand selection when tooth brushing may affect rates of extraction on left or right sides of the oral cavity[18]. Similarly, chewing and cleaning habits and the residence time of food in the mouth may play important roles in rates of extraction on the left or right sides of the jaws. In contrast, Bhat *et al*.[21] found no significant difference between rates of extraction on the left and right sides of the oral cavity. Demirbuga *et al.*[18] reported that right side missing teeth numbered 302 (1.91%) and left side missing teeth amount to 321 (2.03%), and they did not find statistical differences between the right and left sides of jaws. Similar to previous studies, this study's results showed that the numbers of formerly extracted PFM teeth were 60 in the right side and 68 in the left side and showed no statistical differences.

The ideal time for extraction of a PFM is at a chronological age of 8-10 years[11]. Gill *et al*.[23] claimed that extraction of PFM with poor prognosis in this time interval should facilitate mesial movement of the permanent second molar into the PFM area. Otherwise, extraction at a later age may result in unsatisfactory and inadequate space closure, condylar problems and orthodontic malocclusion[24]. In the present study, according to age, the rate of missing teeth was 5.5% in 8-10 age and 57% in 13-15 age, but the time of extraction of the missing teeth was not known exactly.

Nowadays, dental materials and treatment choices have rapidly evolved. Direct/indirect pulp capping, root canal treatment, post-core, inlays/onlays, porcelain and ceramic crowns are good alternative treatments[25]. The results of the study showed that a large number of teeth had extracted between the ages of 11-16. Preventive treatments should be increased for preservation of natural dentition, especially, in females.

Conclusions

In this retrospective study, mandibular first molar teeth were more frequently missing than maxillary teeth,

and females had more missing teeth than males. No difference existed between right and left side teeth loss. Even if PFM tooth loss is common in community, these cases are preventable. Therefore, several factors such as dental education of the community, brushing habits, specialized dental care and conservative treatments should be improved. Further studies with different parameters (socio-economic status, educational status) are necessary**.**

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