



The estimation of early first permanent molars loss in Benghazi children and adolescent aged from 6-14 years

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Received 5 Aug 2025; Accepted 19 Sep 2025; Published 9 Oct 2025

DOI: <https://doi.org/10.64171/JAMS.2025.5.4.4-7>

Abstract

Aim: This study was conducted to evaluate the percentage of early first permanent molars loss in Benghazi Children and adolescents Aged From 6-14 Years.

Materials and Methods: A cross-sectional study was conducted involving 661 patients attending the Dental Clinical Center. The inclusion criteria include: communicative healthy patients, aged between 6 and 14 years, had at least one fully erupted first permanent molar and parental or guardian consent to participate in the study. In this study, the early extracted first permanent molar teeth in both the maxillary and mandibular arches on the right or left side were recorded. Data was presented with descriptive statistics and chi-square tests were applied using IBM SPSS Statistics software 20. The significance level was set at ($P < 0.05$).

Results: A total of 36 (8.30%) children and adolescents from the sample had early missing first permanent molars, most cases of loss about the age of ten with no significant difference between the two genders.

Conclusion: In our study, the percentage of early extraction of first permanent molars was slightly lower. The mandible arch had a higher percentage of loss than the maxilla and the right mandibular first permanent molars were the most teeth lost.

Keywords: First permanent molars, Early tooth loss, Children, Adolescent, Extraction

Introduction

Tooth loss remains a severe public health problem, which would decrease an individual's quality of life ^[1]. "First permanent molars" are the most important permanent teeth, which come to the oral cavity approximately at six years of age ^[2, 3]. They are the teeth of the mixed dentition that are most susceptible to caries, hypomineralization, and periodontal disorders ^[4-6], Which may result in early tooth loss if treatment requirements are not met. Additionally, the arch integrity, development, and maintenance of dental occlusion are significantly influenced by the early loss of "first permanent molars", and may result in a significant alteration of three-dimensional relations of the dental arch, which could significantly affect dental symmetry ^[7].

Treatment planning for carious "first permanent molars" requires careful consideration depending on the restorability of the crown, the degree and type of pulpal inflammation, and the attitudes and cooperation of the patient and their parents ^[8]. The treatment options include restoring the tooth to preserve pulpal vitality, pulp therapy, endodontic therapy, and extraction in certain cases. The unfavorable detriments of early extraction can be minimized by selecting the proper time for extraction ^[9]. The prevalence of tooth loss in children has been demonstrated in a number of previous studies among Saudi children aged

13.6 to 14.6 years, about 13.6% exhibited missing one or more teeth, the causes of tooth loss were extractions, which accounted for 8.6%, followed by hypodontia at 4% and trauma at 1% ^[10]. According to a study conducted in Mexico^[11], the prevalence of "first permanent molar" loss was 2.1% and over 7.5% of adolescents aged 7 to 13 years experienced tooth loss. A recent study conducted by Sutcliffe, 1974 in Northern England revealed that 8% of the assessed 17-year-olds had undergone extraction of their "first permanent molar". Previous studies conducted in Romania indicated that 30 to 40 percent of 13-to 14-year-olds lacking comprehensive dental treatment experienced extraction of their "first permanent molars"^[12,13]. Although the dental literature reveals data on the early loss of "first permanent molars", a few statistics are available in Libya regarding it. Such evidence would assist pediatric dentists to plan and provide immediate measures to prevent space loss and migration of the remaining teeth on the dental arch. For that reason, the current study was planned and conducted to evaluate the percentage of early "first permanent molars" loss in Benghazi Children and adolescents Aged From 6-14 Years.

Materials and Methods

A cross-sectional study was conducted involving 661 patients attending the Dental Clinical Center for specialized medical

services – at Benghazi University, during the years 2016–2019. The study was approved by the scientific ethical committee of the Faculty of Dentistry, Benghazi, Libya, with the code number: 0275. Written consent was taken from the parents/ guardians. Only 432 (216 boys, 216 girls) patients who met the study's inclusion criteria including (a) communicative healthy children and adolescents (b) aged between 6 and 14 years (c) had at least one fully erupted "first permanent molar" (d) with parental or guardian consent to participate in the study. Individual interviews were conducted to collect personal information and medical history. Dental examination was performed under a dental chair light. Gloves, masks, and dental instruments were utilized. A dental examination was performed by a single examiner (N.M. ALamami) to minimize the degree of variability associated with different examiners (kappa = 0.97). In this study, the early extracted "first permanent molar" teeth in both the maxillary and mandibular arches on the right

or left side of the arch were recorded. Data was presented with descriptive statistics and chi-square tests were applied using IBM SPSS Statistics software 20. The significance level was set at ($p < 0.05$).

Results

Out of 661 patients, 229 were excluded (173 were younger than six years of age, 30 were uncooperative, and 26 were medically compromised children). The sample consisted of 432 patients, comprising 216 girls (50%) and 216 boys (50%). They were between 6 years and 14 years (median age 10 years).

A total of 36 (8.30%) children and adolescents (17 boys and 19 girls) from the sample had early missing "first permanent molars", most cases of loss about the age of ten with no significant difference between the two genders, (Table 1). The age distribution of the children with extracted "first permanent molars" can be seen in Figure 1.

Table 1: Distribution of early missing first permanent molars according to age and gender

Gender	Children with early loss	Children without early loss	Totals
Boys	17 (3.90%)	199 (46.10%)	216 (50%)
Girls	19 (4.40%)	197 (45.60%)	216 (50%)
Totals	36 (8.30%)	396 (91.70%)	432 (100%)

$\chi^2 = 0.121$. The p-value is 0.728. at $p < .05$

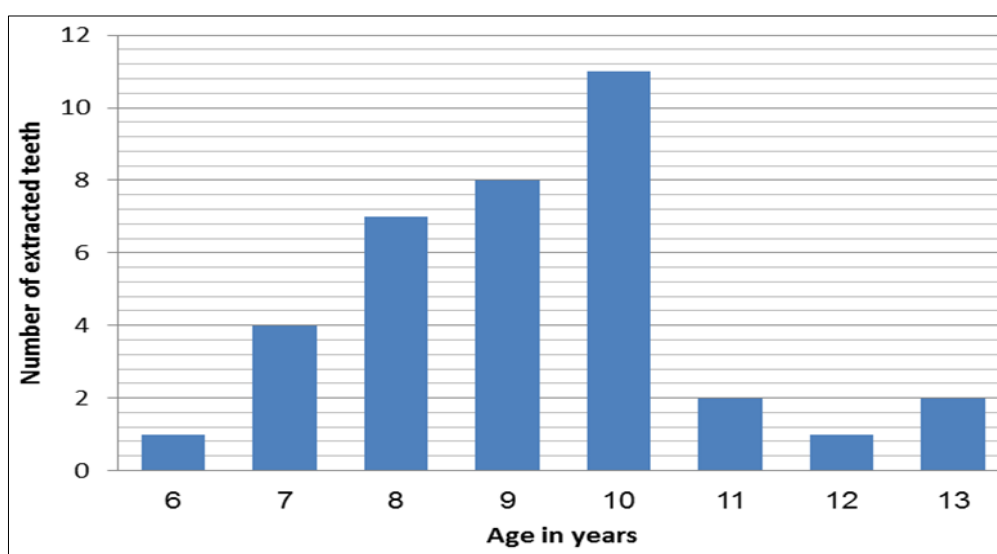


Fig 1: The age distribution of the children with extracted first permanent molars

A total of 73 "first permanent molars" in both dental arches were missing in all children, 39 teeth (53.43%) of them were from the mandible, of which 21 (28.8%) were lower right and 18 (24.6%) were lower left "first permanent molars". In the

maxilla, 34 teeth were lost (46.57%), and 17 teeth (23.3%) were extracted in each upper right and left maxillary arch, with no significant difference between the left and the right sides (Tables 2 & 3).

Table 2: The distribution of early lost first permanent molars per dental arch

Dental arch	Number of teeth lost in boys	Number of teeth lost in girls	Totals
Maxillary arch	18 (24.66%)	16 (21.91%)	34 (46.57%)
Mandibular arch	22 (30.14%)	17 (23.29%)	39 (53.43%)
Totals	40 (54.80%)	33 (45.20%)	73 (100%)

$\chi^2 = 0.088$. P-value is 0.766. at $p < .05$

Table 3: Distribution of early first permanent molar loss per tooth side

Tooth side	Number of teeth lost in boys	Number of teeth lost in girls	Totals
Right maxillary first permanent molars	10 (13.70%)	7 (9.59%)	17 (23.3%)
Left maxillary first permanent molars	8 (10.96%)	9 (12.33%)	17 (23.3%)
Right mandibular first permanent molars	10 (13.70%)	11 (15.07%)	21 (28.8%)
Left mandibular first permanent molars	12 (16.44%)	6 (8.21%)	18 (24.6%)
Total	40 (54.80%)	33 (45.20)	73 (100%)

$\chi^2=1.983$. The p-value is 0.576. At $p < .05$.

A total of sixteen children had more than one extracted "first permanent molars"; among them, ten were girls (three with two extractions, two with three extractions, and five with four extractions), and six boys (five with four extractions and one with two extractions).

Discussion

The "first permanent molars" have a crucial role in establishing and maintaining proper occlusion. However, this role is often compromised by their susceptibility to dental caries and developmental structural defects, which, if left untreated, can result in their progressive destruction [14-16].

In our study, the percentage of early extraction of "first permanent molars" was slightly lower, this was in agreement with previous studies [3, 10, 11, 17], where's was in disagreement with studies conducted in Romania indicated that 30 to 40 percent of their sample had missing of "first permanent molars" [3, 13]. This can be explained by the difference in age range between the Romanian study (13–14 years) and our study (from 6 to 14 years).

In the present study, no significant difference was observed between the two genders, and most cases of loss occurred around the age of ten. This may be due to most dentists preferred to extract "first permanent molars" at this age to allow bodily movement of second permanent molars. This was in agreement with Răducanu et al. [3], who expected that the prevalence of loss was increased with the age of the patients. Sixteen children had more than one extracted "first permanent molars", among them ten girls and boys have four extracted "first permanent molars", this was in agreement with Răducanu et al. [3], where they found in their study eleven children presented with more than one extracted "first permanent molar", of whom four with four extracted "first permanent molars", our explanation is the preference of dentist to do balancing extraction in one arch and a compensating extraction of opposing arch.

The finding that, there had been a higher proportion of "first permanent molar" extractions in the mandible confirmed the findings of other multiple studies which have reported that the lower "first permanent molars" were found missing more frequently than the upper "first permanent molars" [18-20]. The possible reasons for this may be the earlier eruption of the mandibular molars and its higher caries risk due to the complex occlusal fissure system that predisposes to bacterial plaque accumulation. The difference was statistically not significant. This study has certain limitations, particularly the small sample size, which was restricted to patients attending the Dental

Clinical Center for Specialized Medical Services – at Benghazi University; As a result, the findings may not be fully representative of the Libyan population. However, a notable strength of this study was that all clinical examinations were performed by a single calibrated examiner, who demonstrated excellent intra- and inter-examiner reliability, thereby minimizing the potential of examiner-related variability. However, more studies are needed with a larger and more diverse sample to confirm these findings.

Conclusions

Of all sample, only 8.30% of children and adolescents had early loss of "first permanent molars", most cases of loss at about the age of ten. In both dental arches the mandible had a higher percentage of loss than the maxilla and the right mandibular "first permanent molars" were the most teeth lost. It is essential to take proactive measures to reduce the early loss of "first permanent molars". Raising awareness among parents and guardians about the importance of their role, along with the implementation of effective preventive strategies, can often help avoid the loss of first permanent molars.

Acknowledgments

The authors would like to thank all the children and their parents at the Dental clinical Center who agreed to participate in this study, their involvement and cooperation were essential and greatly appreciated.

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