



وزارة التعليم العالي والبحث العلمي

جامعة بابل

كلية طب الاسنان

قسم طب اسنان الاطفال والوقائي

Mortality of First Permanent Molars among 6-15 Years Old Children in Hilla city

بحث تخرج الطلبة للعام الدراسي 2021-2022

في قسم طب الاسنان الوقائي والاطفال

اسماء الطلبة :

آيات حيدر حميد

زهراء علاء الدين حبيب

زيد زهير جبار

زينب احمد ماجد

زينب علي كشاش

المشرفين:

ا.م.د. احمد محمد

م.د. حسن فليح فرحان

Introduction

The First Permanent Molar (FPM) is unquestionably the most important unit of mastication and is essential in the development of functionally desirable occlusion. The first permanent molars were more susceptible to dental caries and they have the highest caries attack rate among the permanent dentition. The molar teeth have many pits and fissures on the chewing (occlusal) surfaces and on the buccal and palatal surfaces, which can be very difficult to keep clean. These sites are most susceptible to developing decay (1). At about the age of 6, the first permanent molar will erupt behind the four ends of deciduous teeth; it is also called the six-year molar (2). Due to the importance of these teeth in the dentition, as their surfaces would need to be sealed with pit and fissure sealants, this is considered as the most cost-effective way (3). During the mixed-dentition stage of dental development, dentists may encounter patients with first permanent molars considered to have a poor long-term prognosis. In this situation, extraction of the tooth and space closure or use of the extraction space for future orthodontic treatment should be considered (4). The ideal time for the loss of the mandibular FPM is before the eruption of the second permanent molar, usually at a chronological age of 8-9 years (4). Studies have reported that the extraction of first molars causes a lingual inclination of the lower incisors, overeruption of opposing tooth (5), mesial tipping of second permanent molars and distal tipping of permanent premolar accompanying with midline shift into the extraction side (6, 7). All these can justify the need for orthodontic treatment and rehabilitation due to the occlusal changes complexity (7). Compensating extraction involves extraction of an antagonistic molar to prevent its overeruption. Overeruption of the upper FPM can prevent mesial migration of the mandibular second permanent molar and increase its mesial tipping and may predispose to later temporomandibular joint dysfunction. Balancing involves removal of a contralateral tooth, which does not necessarily be a FPM, to preserve the dental midline. Balancing and compensating extractions should be considered during the mixed-dentition stage if no active appliance treatment is to be undertaken (4). When planning extraction of FPMs with poor prognosis it is important to consider whether future active appliance treatment will be necessary. If such therapy is not needed, consideration should be given to extraction at the ideal developmental age to achieve spontaneous space closure. Each case should be assessed for the need of balancing or compensating extractions to preserve the dental midline and prevent overeruption, respectively. If future appliance treatment is likely to be necessary, it is important to seek specialist advice,

and it may be more appropriate to stabilize the FPMs until the second molars erupt so that extraction space can be used to relieve crowding and reduce overjet (4, 8).

Previous studies in Iraq and the world were reported different findings regarding caries experience and mortality of first permanent molars among children and adolescents (9-14). The present study is aimed at identifying the mortality and caries experience of first permanent molars among children attending dental hospital in College of Dentistry/University of Babylon. The result will facilitate the development of an approach in treatments relevant to the problem and assist in addressing the oral health needs of the society, thus minimizing tooth loss.

Materials and Methods

The sample was collected from children attending the Prevention and Pedodontics dental clinic in the College of Dentistry, University of Babylon as a first visit. All selected children were examined for dental caries by disposable mirror and explorer utilizing the World Health Organization WHO criteria in 2013 (15) for the diagnosis of dental caries. Consent forms were obtained from their parents or caregivers prior to the examination. Intra and inter examiner calibrations were done to obtain the most critical consistency of data. Data were translated into a computerized database structure. Statistical analysis was done by using SPSS version 18. Person correlation coefficient was used to find a correlation between age and missing FPMs. Independent sample t-test was used to determine if there is a difference between gender as well as location in relation to missing FPMs. The probability was accepted at 5% significance level.

Results:

The prevalence of dental caries in this study was 90.5%. Out of 200 examined child, 53 (26.5%) had one, two or three missing FPMs at the time of the examination as illustrated in table (1). This table illustrates the distribution of missing first permanent molars due to caries by age. The total number of missing FPMs was 62. Results revealed that the children at age 14 years were had the higher percentage (21%) of missing FPMs than the other age groups; while the children at age (6) years were had, no missing FPMs. Person correlation coefficient demonstrates a strong, and positive correlation ($r=0.80$) between age and missing teeth in which number of missing FPMs is increasing with age.

Table 1: Distribution of Missing First Permanent Molars due to caries by age.

Age	No.	Missing teeth	
		No.	%
6 year	0	0	0
7 year	2	2	3.2
8 year	3	4	6.4
9 year	4	4	6.4
10 year	5	5	8.1
11 year	4	4	6.4
12 year	7	7	11.3
13 year	8	11	17.7
14 year	11	13	21
15 year	9	12	19.4
Total	53	62	100

Table (2) shows the distribution of Missing FPMs due to caries by gender. The total sample composed of (53) child (22 (41.6%) males and 31(58.4%) females). Females demonstrated a higher percentage (56.4%) of missing FPMs than males (43.6%). However, t-test shows no significant difference between males and females regarding the number of missing FPMs $p > 0.05$.

Table 2: Distribution of Missing First Permanent Molars due to caries by gender.

Gender	No. (%)	Missing teeth	
		No.	%
Male	22 (41.6)	27	43.6
Female	31(58.4)	35	56.4
Total	53 (100)	62	100

Table (3) shows the distribution of Missing FPMs due to caries by location. Results showed that a higher percentage of children were had missing FPMs in one and both sides of the lower jaw (71%) compared to the upper jaw (29%). Results revealed the sextant distribution of missing FPMs due to caries is (lower right 40.3% followed by lower left 30.7% then upper right 17.7% and upper left 11.3%). T-test shows a significant difference between upper and lower jaws in relation to location of missing FPMs $P < 0.05$.

Table 3: Distribution of Missing First Permanent Molars due to caries by location.

Location	No. (%)	Missing teeth			
		Right		Left	
		No.	%	No.	%
Upper	18 (29)	11	17.7	7	11.3
Lower	44 (71)	25	40.3	19	30.7
Total	62 (100)	36	58	26	42

Figure (1) illustrates the distribution of Missing FPMs due to caries by location and number. The result shows that the majority of children had one missing tooth (90.3%) followed by two missing teeth (6.5%) then three missing teeth (3.2).

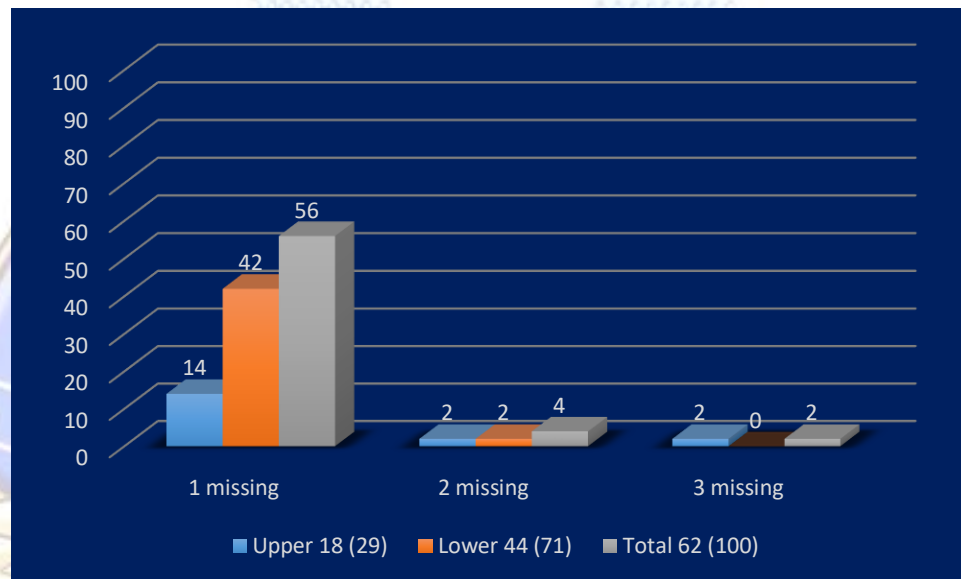


Figure 1: Distribution of Missing First Permanent Molars due to caries by number.

Discussion:

The FPM is the first permanent tooth erupts in the oral cavity, because of the significance of their positions and the circumstances surrounding their eruption. This study was found that at age of six years, children had no missing FPMs and low percentage of decayed teeth. Such findings are coincide with other studies, which reported a higher percentage rate of caries free children at this age group (9, 12, 16). This may be due to the irreversibility and accumulative nature of dental caries as dental caries need enough time to develop and first permanent molar is begins to erupt at age six years (17). The study also showed the distribution of missing first permanent molar due to caries is increasing with age. This may explain the negligence of dental health among those teenage children due to limitation in the knowledge of keeping first permanent molars. Thus, age is an important variable that should always be taken in account in caries studies.

The present study revealed that higher percentage of missing FPMs were found among females than males. This is in agreement with other studies (16, 18) and in disagreement with another study found the opposite results (12). This can be explained that the first permanent molars erupt earlier in females than males (9, 19, 20), thus exposed more to environmental factors (21). The first permanent molars are considered the "cornerstones" of the dental arches (22). This tooth is more vulnerable to caries than others because of its functional and morphological characteristics; an increase in carious lesion development would manifest itself first in pits and fissures (3, 16).

The present study recorded that the higher percentage of children were found with missing FPMs in lower jaw than the upper jaw, this finding concurrent with other studies (16, 18, 23). This may be due to morphology and eruption time of the tooth. Mandibular first permanent molar has more number of pits and supplementary grooves, which can act as food retentive areas promoting caries. The other factor could be that in majority of children mandibular first permanent molar erupts slightly earlier than its maxillary counterpart, hence mandibular first permanent molar being exposed to the oral environment for a longer period of time, making it more susceptible to caries than maxillary first permanent molar (16). Although the majority of children had one missing tooth, most decayed FPMs were badly carious and non-restorable teeth or with poor prognosis that could be extracted or undergone balancing or compensating extractions. Therefore, the percentage of missing FPMs might be increased.

Conclusions:

The present study reported that the number of missing FPMs is increasing with age. Females demonstrated a higher percentage of missing FPMs than males. The study also found a higher percentage of children with missing first permanent molars in the lower jaw compared to the upper jaw. A preventive program should be developed early in life and more care should be given to conserve the first permanent molars.

References:

1. Ahovuo-Saloranta A, Forss H, Walsh T, Nordblad A, Mäkelä M, Worthington HV. Pit and fissure sealants for preventing dental decay in permanent teeth. The Cochrane database of systematic reviews. 2017;7(7):Cd001830.
2. Clements E, Davies-Thomas E, Pickett KG. Time of eruption of permanent teeth in British children at independent, rural, and urban schools. British medical journal. 1957;1(5034):1511.
3. Yengopal V, Mickenautsch S, Bezerra AC, Leal SC. Caries-preventive effect of glass ionomer and resin-based fissure sealants on permanent teeth: a meta analysis. Journal of oral science. 2009;51(3):373-82.
4. Gill DS, Lee RT, Tredwin CJ. Treatment planning for the loss of first permanent molars. Dental update. 2001;28(6):304-8.
5. Normando D, Cavacami C. The influence of bilateral lower first permanent molar loss on dentofacial morphology: a cephalometric study. Dental Press Journal of Orthodontics. 2010;15:100-6.
6. Jälevik B, Möller M. Evaluation of spontaneous space closure and development of permanent dentition after extraction of hypomineralized permanent first molars. International journal of paediatric dentistry. 2007;17(5):328-35.
7. Sousa ASd, Araújo FRL, Villela GSC, Normando D. Impact of Early Loss of Lower First Permanent Molars on Third Molar Development and Position. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 2021;21.
8. Ong DV, Bleakley J. Compromised first permanent molars: an orthodontic perspective. Australian dental journal. 2010;55(1):2-14.
9. Al-Sayyab M, Al-Alousi W, El-Samarrai S. Mortality of first permanent molars among Iraqi children living in two Iraqi villages (Sheha, Al-Buetha). J College of Dent. 1995:261-5.
10. Skeie MS. Dental caries in children aged 3-10 years: longitudinal and cross-sectional studies. 2005.

11. Hopcraft MS, Morgan MV. Comparison of radiographic and clinical diagnosis of approximal and occlusal dental caries in a young adult population. *Community dentistry and oral epidemiology*. 2005;33(3):212-8.
12. Mohammed AT. Caries experience of the first permanent molars among a group of children attending pedodontics' clinic college of dentistry. *Journal of baghdad college of dentistry*. 2011;23(3).
13. Zakirulla M. Prevalance of first permanent molar caries among 7-10 years old school going boys in Abha City, Saudi Arabia. *Bangladesh Journal of Medical Science*. 2012;11(2).
14. Jain A, Mani G, Kumar R P. Most Frequently Extracted Permanent Tooth in Patients Below 18 Years of Age Visiting a University Hospital in Chennai--A Retrospective Study. *Indian Journal of Forensic Medicine & Toxicology*. 2020;14(4).
15. Organization WH. Oral health surveys: basic methods: World Health Organization; 2013.
16. Togoo RA, Yaseen SM, Zakirulla M, Al Garni F, Khoraj AL, Meer A. Prevalance of first permanent molar caries among 7-10 years old school going boys in Abha city, Saudi Arabia. *Journal of International Oral Health*. 2011;3(5):29.
17. Thylstrup A, Fejerskov O. Textbook of clinical cariology: Munksgaard; 1996.
18. Haddi RJ, NJMR. Mortality of First Permanent Molars among 6-12 Years Old Children Attending Dental Hospital / College of Dentistry, University of Baghdad. *International Journal of Science and Research (IJSR)* ISSN (Online): 2319-7064. 2015.
19. Al-Farhan S. Aspects of Dental Health in Iran: University of Dundee; 1976.
20. Teivens A, Mörnstad H, Reventlid M. Individual variation of tooth development in Swedish children. *Swedish Dental Journal*. 1996;20(3):87-93.
21. Ghaib NH. Eruption time of permanent teeth in Iraqi school children. *Journal of Baghdad College of Dentistry*. 2002;12:94-7.
22. Dean JA. McDonald and Avery's dentistry for the child and adolescent-E-book: Elsevier Health Sciences; 2021.

23. Ekstrand KR, Christiansen J, Christiansen MEC. Time and duration of eruption of first and second permanent molars: a longitudinal investigation. Community dentistry and oral epidemiology. 2003;31(5):344-50.

