

Prevalence of Early Primary Teeth Loss in 5–9-year-old Schoolchildren in and around Melmaruvathur: A Cross-sectional Study

Selvabalaji A¹, Vasanthakumari A², Ishwarya M³, Preethi Archana S⁴, Ekambareswaran K⁵, Swetha RK⁶

ABSTRACT

Aim: The goal of this study was to determine the frequency of early primary tooth loss among school children in and around Melmaruvathur, Tamil Nadu, India.

Materials and methods: A cross-sectional study involving all the children aged between 5 and 9 years in and around Melmaruvathur, Tamil Nadu, India, from January 2022 to July 2022 was conducted. A total of 20 government schools were approached for participation in the study, study population consisted of 800 government school children (358 boys and 442 girls). All clinical assessments were done in the natural light by an experienced examiner. Age and missing teeth were among the data gathered.

Results: The findings revealed that 20.8% of the sample had lost their primary teeth before the age of 6 ($p > 0.05$), although no gender differences were seen, males (12.6%) were more commonly affected than females (8.2%). The mandibular arch (61.8%) was more commonly affected than the maxillary arch (38.2%). In accordance with the frequency of early loss of teeth relative to tooth type, the molars (98.2%) were the most commonly prematurely lost teeth followed by the incisors (1.5%) and the cuspids (0.3%). The left lower primary first molars (42.3%) were the most often missing teeth, and the frequency was highest in 8-year-old children (38.9%).

Conclusion: It was shown that lower primary molars were the most often missing teeth in the current investigation, and that early loss was highly prevalent.

Clinical significance: Early loss of primary teeth leads to lots of malocclusion problems mainly arch length discrepancies are seen. Early detection and management of the space problems associated with the early loss of primary teeth would help in reducing malocclusion problems.

Keywords: Dental caries, Early loss, Malocclusion, Prevalence.

The Journal of Contemporary Dental Practice (2022): 10.5005/jp-journals-10024-3403

INTRODUCTION

Deciduous dentition is accountable for chewing, speech, and language abilities. Early tooth loss, also known as early tooth exfoliation, is the term used to describe the loss of teeth in the oral cavity before the time normally predicted. This early loss may be influenced by systemic as well as neighborhood influences.¹ Premature tooth loss can be caused by dental trauma, neonatal enamel removal, early childhood caries, periodontal problems, or it could be a symptom of a systemic illness.² Early primary tooth loss can lead to crowding, ectopic eruption, or enamel impaction, which can result in a malocclusion, as well as orthodontic problems including crowding.³

Most commonly malocclusion is seen in the sagittal, transverse, and vertical planes due to premature loss of primary teeth.⁴ According to studies, the early loss of primary teeth causes the dental arch length will be reduced and the antagonist, marginal teeth to migrate, which causes the permanent teeth to rotate, crowd, and impaction.^{5–9} In addition, if a primary second molar is lost, the mandible has a greater decrease in dental arch length than the maxilla.^{10–11} For instance, mesial migration of permanent first molars causes the arch length to be reduced as a result of early loss of the primary second molar, particularly in the maxillary arch.⁷

For a normal permanent occlusion to be established, primary teeth must be maintained.^{1,2} The most frequent reasons for early loss of primary teeth include poor oral hygiene, dental caries, and

^{1–6}Department of Pediatric and Preventive Dentistry, Adhiparasakthi Dental College & Hospital, Melmaruvathur, Tamil Nadu, India

Corresponding Author: Ishwarya M, Department of Pediatric and Preventive Dentistry, Adhiparasakthi Dental College & Hospital, Melmaruvathur, Tamil Nadu, India, Phone: +91 8124510084, e-mail: drishwaryamani@gmail.com

How to cite this article: Selvabalaji A, Vasanthakumari, A, Ishwarya M, et al. Prevalence of Early Primary Teeth Loss in 5–9-year-old Schoolchildren in and around Melmaruvathur: A Cross-sectional Study. *J Contemp Dent Pract* 2022;23(10):1004–1007.

Source of support: Nil

Conflict of interest: None

dental trauma. The most common contributing element to the high incidence of loss is still tooth decay.^{3–5} Maxillary arch premature tooth loss may need extractions of permanent teeth to align the dental arch, whereas premature mandibular loss may need long-term orthodontic therapy in most cases.

The purpose of this study was to assess the prevalence of early primary tooth loss in school children aged 5–9 years.

MATERIALS AND METHODS

This study is a cross-sectional study involving all the children aged between 5 and 9 years in and around Melmaruvathur, Tamil Nadu, India from January 2022 to July 2022. A total of 20

government schools were approached for participation in this study. The studied population consisted of 800 government school children in and around Melmaruvathur, Tamil Nadu, India aged 5–9 (358 boys and 442 girls). Permission was obtained from the concerned head of the schools and they were informed that the study had received ethical clearance from the institution. Further consent forms were provided which contained a detailed account of the study's purpose. The parents/guardians who allowed the participation of their children/wards were informed about the study and requested to sign the informed consents that were provided. Children of age between 5 and 9 years and their parents agreed to participate in this study and signed the informed consent were included. Children who were medically compromised, whose parent/guardian did not provide consent for participation, or children who did not cooperate with clinical evaluation were excluded from the study. A single examiner examined the children and a competent dentist filled out the survey form. The factors recorded were the demographic data such as age, and gender; clinical data comprised of early primary tooth loss using Kornfeld's hypothesized chronological schedule of permanent teeth eruption, according to the age, gender, arch, tooth type, and quadrant-wise distribution. Data were recorded, tabulated, and entered into a spreadsheet in Microsoft Excel 2019 (Microsoft Office XP), which was then statistically analyzed with statistical software SPSS21. Chi-squared tests were performed using descriptive statistics with a level of significance of 5% ($p > 0.05$).

RESULTS

This study group included 800 children in total ($n = 800$), 167 (20.8%) children had prematurely lost primary teeth in about 101 boys and about 66 girls, and the highest prevalence was registered at approximately the age of 8 years followed by 7 years and boys had the highest prevalence than girls (Table 1).

The prevalence of prematurely lost primary teeth is about 338 with the FDI tooth number 74 being lost at the highest rate (Table 2).

The age data indicate that there was a higher loss prevalence (5.08%) among 8-year-old children, and the second highest was found in 7-year-old children. Male children were about 101 (12.6%) of the population, while female children were about 66 (8.25%) (Table 1). The tooth with the superlative prevalence was 74 [lower (mandible) right first primary molar], accounting for 24.6% of the total cases after which 75 [lower (mandibular) right second molar], was the most prevalent accounting for 18.4% of the cases. In terms of the total early teeth loss, 86 (51.5%) kids lost only one tooth, 37 (22.1%) kids lost two teeth, 23 (13.8%) kids lost three teeth, 14 (8.5%) kids lost four teeth, and 7 (4.1%) kids lost five teeth (Fig. 1) Caries-related extractions accounted for the majority of primary teeth lost too soon. Only 6 incisors teeth were lost out of which 2 were lost due to trauma (Table 2).

Table 1: Frequency of early primary teeth loss in school children according to age and sex

Sex	Age					Total	Total prevalence (%)
	5	6	7	8	9		
Boys	11	17	28	39	6	101	12.625
Girls	6	11	19	26	4	66	8.25
Total	17	28	54	65	10	167	20.8

Table 2: The gender-related frequency of primary teeth affected with the highest early loss

Tooth	Sex		Total	Total (%)
	Boys	Girls		
51	2	1	3	0.8
52	0	0	0	0
53	1	0	1	0.2
54	14	12	26	7.6
55	16	18	34	10
61	0	2	2	0.5
62	0	0	0	0
63	0	0	0	0
64	21	19	40	12
65	14	9	23	6.9
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	48	34	82	24.5
75	32	29	61	18
81	0	0	0	0
82	0	0	0	0
83	0	0	0	0
84	17	21	38	11.3
85	12	16	28	8.2
Total	177	161	338	100

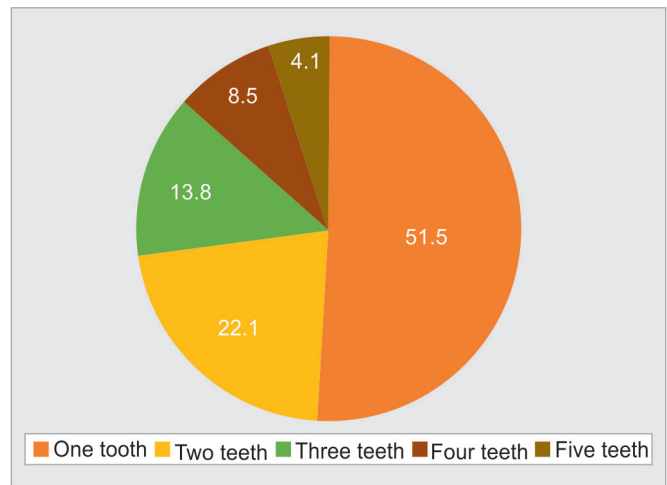


Fig. 1: Distribution based on number of tooth loss

In accordance with the frequency of early deciduous teeth loss relative to tooth type, the molars (98.2%) were the most commonly prematurely lost teeth subsequently the incisors (1.5%) and the cuspids (0.3%) (Tables 3 and 4).

The mandibular arch (61.8%) had more cases of prematurely lost teeth than the maxillary arch (38.2%), based on the prevalence of prematurely lost teeth relative to the dental arch. Primary tooth loss was highest in the mandibular left quadrant

Table 3: Primary teeth distribution affected by early loss according to tooth (central incisor, lateral incisor, cuspids, first molar, and second molar)

Tooth	Boys	Girls	Total	Total (%)
Central incisor	2	3	5	1.5
Lateral incisor	0	0	0	0
Cuspids	1	0	1	0.3
First molar	100	86	186	55.0
Second molar	74	72	146	43.2
Total	177	161	338	100

Table 4: Early loss affected primary teeth distribution, according to tooth (central incisor, lateral incisor, cuspids, first molar, and second molar)

Type of tooth	Boys	Girls	Total (%)
Central incisor	2	3	1.5
Cuspids	1	0	0.3
Molar	174	158	98.2
Total	177	161	100

Table 5: Premature primary tooth loss distribution by quadrant in relation to gender

Quadrant	Boys	Girls	Total	Total (%)
Maxillary right quadrant	33	31	64	19
Maxillary left quadrant	35	30	65	19.2
Mandibular right quadrant	29	37	66	19.5
Mandibular left quadrant	80	63	143	42.3
	177	161	338	100

Table 6: Distribution of premature loss of primary tooth stated by arch type

Type of arch	Prevalence (%)
Maxillary arch	38.2
Mandibular arch	61.8

(42.3%) (Tables 5 and 6). The outcome was highly significant statistically ($p = 0.000$).

DISCUSSION

Research has shown that early loss of primary teeth occurs in many parts of the world.¹⁻⁶ This study evaluated 800 school students in and around Melmaruvathur, Tamil Nadu, India including 800 (358 males and 442 girls). In this study, 167 children with a prevalence of 20.8% early primary tooth loss were identified, 66 (8.5%) of whom were girls and 101 (12%) boys. These results concurred with those of Leite-Cavalcanti et al. study conducted in Brazil.^{2,3} The fact that many practitioners choose to extract primary teeth rather than making an effort to save them may be the cause of the incidence of early primary tooth loss in this study.⁴ It could possibly be because parents do not give primary teeth much thought because they believe that they will eventually be replaced.⁵ In comparison to girl children (39.5%), boy children (60.5%) had a higher prevalence of

early loss, according to the findings. The result might be attributed to the fact that the probability of *Streptococci mutans* acquisition in babies increases with age, or by an increase in the number of erupted teeth.⁶ The first molars may also be highly susceptible to early *S. mutans* colonization.⁶

The first molars could also be particularly at risk to initial *S. mutans* colonization. They invade the mouth between the age of 16 and 29 months and have an impact on both the occlusal and proximal surfaces. Smooth surfaces are more easily colonized by *S. mutans* than occlusal surfaces.⁷ This may result in caries of the primary molars, which, if left untreated, may result in premature extraction, adding to early loss.⁸ Mahejabeen et al. in their study conducted in Darward city (in Karnataka, India) stated that the increased D (Decayed), M (Missing) due to caries, and F (Filled) teeth (DMFT) scores in boys may be related to their nutrition.^{9,10} In this study, the age group with the highest percentage of early dental losses was 8, then 7 and 6. This study's conclusion was identical to those made by Alamoudi¹ and Leite-Cavalcanti et al.³ in their respective studies conducted in Brazil. Furthermore, by studying the prevalence of early loss on the arches, we determined that the mandibular arch had the highest occurrence. These findings were similar to an earlier study done by Saravanan et al. in Chidambaram city.⁹

The increased loss of primary teeth within the mandibular arch is also because of food impaction and increased plaque accumulation within the posterior region of the mandible, additionally saliva has anticaries abilities and is relatively abundant within the maxillary molar teeth, reducing the frequency of early tooth loss.⁹ Furthermore, saliva exhibits anticaries characteristics and is frequently associated with maxillary molar teeth, lowering the rate of early tooth loss. This study found that deciduous first molars had a higher prevalence of early loss than the second molars. The first deciduous molar emerges before the second deciduous molar; therefore, it had spent more time in the oral cavity than the second primary molar. This could be the cause of the difference in the ages of the first and second primary molars. The first primary molars were typically extracted in these situations because the success rate of endodontics, the alternative treatment, was noticeably lower. This may also be the case from a clinical perspective; whereas many dentists would attempt to save a grossly carious second deciduous molar to maintain space, mainly before the eruption of the first deciduous molars.¹ Dental caries was the main reason for primary teeth extractions, followed by trauma. In the current investigation, this resulted in a statistically significant outcome ($p = 0.000$). Following the screening in each school, the kids were given oral hygiene instructions and information about the effects of losing their primary teeth too soon. Teachers and parents/guardians received pamphlets with information¹¹⁻¹⁴ about the value of primary teeth and how to preserve them.

Due to the negative effects of early primary tooth loss, it is imperative to raise oral health awareness by implementing school dental health programs that inform students and their parents about the negative effects of early primary tooth loss.¹⁵⁻¹⁷ Therefore, it is important to educate kids on the importance of primary teeth so that they would pay attention to their preservation. Children whose primary teeth have fallen out early should be advised to use space maintainers if necessary. It is important to tell the parents of those kids to bring their kids to the dental facility so that the treatment can be completed.¹⁷⁻¹⁹ The main limitation of the study is the limited sample size, further studies are needed with a large sample size for more accurate results.

CONCLUSION

The prevalence of early primary tooth loss was significant (20.8%), and it was greater at 8 years of age, boys lost more primary teeth (12%) than girls (8.75%). First primary molars had a higher prevalence of early loss (55%), with lower right first primary molars being most frequently affected the lower left primary second molar (24.5%) was the most frequently missing tooth. As a result, it is essential to increase oral health awareness among children and their parents in order to make them understand the significance of deciduous teeth. Parents should be encouraged to bring their children to the dental clinic for a dental check-up every 6 months.

REFERENCES

1. Alamoudi N. The Prevalence of crowding, attrition, midline discrepancies and premature tooth loss in the primary dentition of children in Jeddah, Saudi Arabia. *J Clin Pediatr Dent* 1999;24: 53–58. PMID: 10709544.
2. Leite–Cavalcanti A, Menezes SA, Granville–Garcia AF, et al. Prevalence of early loss of primary molars: Study retrospective. *Acta Sci Health Sci* 2008;30:139–143.
3. Leite–Cavalcanti A, de Alencar CR, Bezerra PK, et al. Prevalence of early loss of primary molars in school children in Campina Grande, Brazil *Pak Oral Dent J* 2008;28:113–116.
4. McDonald RE, Avery DR, Dean JA. Eruption of teeth: Local, systemic and congenital factors that influence the process. *Dent Child Adolesc* 2005;8:174–202.
5. Cardoso L, Zembruski C, Fernandes DS, et al. Evaluation of prevalence of precocious loss of deciduous molars. *Braz Res Pediatr Dent Integr Clin* 2005;5:17–22.
6. Kelner N, Rodrigues MJ, Miranda K. Prevalence of early loss of deciduous molars in children attending the FOP/UPE in 2002 and 2003. *Dent Clin Sci Recife* 2005;4:213–218.
7. Caufield PW, Cutter GR, Dasanayake AP. Initial acquisition of mutans streptococci by infants: Evidence for a discrete window of infectivity. *J Dent Res* 1993;72(1):37–45. DOI: 10.1177/00220345930720010501.
8. Alamoudi N, Salako N, Masoud I. Prevalence and distribution of caries in the primary dentition in a Cosmopolitan Saudi Population. *Saudi Dent J* 1995;7:24–28.
9. Saravanan S, Kalyani V, Vijayarani MP, et al. Caries prevalence and treatment needs of rural school children in Chidambaram Taluk, Tamil Nadu, South India. *Indian J Dent Res* 2008;19(3):186–190. DOI: 10.4103/0970-9290.42948.
10. Mahejabeen R, Sudha P, Kulkarni SS, et al. Dental caries prevalence among preschool children of Hubli: Dharwad city. *J Indian Soc Pedod Prev Dent* 2006;24:19–22.
11. Loto AO. Relative prevalence of caries in first and second premolars in urban Nigerians. *Odontostomatol Trop* 1998;21(84):23–26. PMID: 11372109.
12. Ahamed SS, Reddy VN, Krishnakumar R, et al. Prevalence of early loss of primary teeth in 5–10-year-old school children in Chidambaram town. *Contemporary clinical dentistry*. 2012;3(1):27. DOI: 10.4103/0976-237X.94542.
13. Ngan P, Alkire RG, Fields H Jr. Management of space problems in the primary and mixed dentitions. *J Am Dent Assoc* 1999;130:1330–1339. DOI: 10.14219/jada.archive.1999.0403.
14. Macena MCB, Katz CRT, Heimer MV, et al. Space changes after premature loss of deciduous molars among Brazilian children. *Am J Orthod Dentofacial Orthop* 2011;140(6):771–778. DOI: 10.1016/j.ajodo.2011.04.023.
15. Tunison W, Flores–Mir C, ElBadrawy H, et al. Dental arch space changes following premature loss of primary first molars: A systemic review. *Pediatr Dent* 2008;30(4):297–302. PMID: 18767508.
16. Alnahawi HH, Donly KJ, Contreras CI. Space loss following premature loss of primary second molars. *Gen Dent* 2015;63:e1–e4. PMID: 26545280.
17. Al-Shahrani N, Al-Amri A, Hegazi F, et al. The prevalence of premature loss of primary teeth and its impact on malocclusion in the Eastern Province of Saudi Arabia. *Acta Odontol Scand* 2015;73(7):544–549. DOI: 10.3109/00016357.2014.939709.
18. Holan G, Needleman HL. Premature loss of primary anterior teeth due to trauma: Potential short- and long-term sequelae. *Dent Traumatol* 2014;30(2):100–106. DOI: 10.1111/edt.12081.
19. Reddy NV, Daneswari V, Shruti G, et al. Premature loss of primary teeth on arch dimensions in 6-to 10-year-old schoolchildren in Khammam town, Telangana state. *Int J Pedod Rehabil* 2018;3(2):67–71. DOI: 10.4103/ijpr.ijpr_28_17.