



Prevalence of missing mandibular molars in 15-17 year old students in Calicut District of Kerala State, India

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Abstract

The first permanent molar is exposed to the oral environment for a longer period of time than any other permanent tooth. Also, first permanent molars have deep pits and fissures which are more susceptible to food lodgment. This in turn leads to increased susceptibility to dental caries and subsequent tooth loss.

Aim: *The aim of the study is to evaluate the prevalence of missing mandibular first molar due to caries in the age group of 15-17 year old students in Calicut district.*

Materials and Methods: *A crosssectional study was conducted in 16 schools in the urban and rural strata in the four taluks of Calicut district, Kerala. Clinical examination was done by five dentists and the findings were entered in survey sheets. Questions regarding their habits, age, and gender were also noted.*

Results: *The prevalence of missing molars in Calicut district in age group 15-17 years was 3.78%. Higher prevalence rate of missing mandibular molars in rural areas (4.13%) was noted compared to the urban areas (3.44%) in Calicut district. The prevalence of missing mandibular molars was more in subjects who did not use mouth wash and the results were statistically significant (p value less than 0.05).*

Keywords: *Mandibular molars, Dental caries, Malocclusion, Oral hygiene, Occlusion.*

Introduction

Mandibular first molar is the first permanent tooth to erupt at the age of six years and has a pivotal role in guiding the eruption of other permanent teeth and maintenance of occlusion. It also helps to maintain facial height, facial growth, anterior-posterior and

transverse growth of both jaws.⁽¹⁾ At this age, it is the most posterior tooth in the oral cavity and the accessibility and dexterity to maintain the oral hygiene in that area is difficult for a young child⁽²⁾ Dental caries and periodontal disease were the main reasons for tooth extraction.⁽³⁾ Loss of first

permanent molars, because of dental caries, negatively affects both arches and has adverse effects on occlusion. It is reported that early extraction of these teeth results in tilting of neighboring teeth to hollow spaces, supereruption of the teeth in the opposite arch, unilateral chewing, shift in midline and dental malocclusion.⁽⁴⁾ The first permanent molar has been quoted as being the most caries-prone tooth in the permanent dentition, probably as a result of its early exposure to the oral environment.⁽⁵⁾ Understanding the etiology that leads to loss of first permanent molar in a population is important in conducting dental health programs for preventive measures.

Thus the aim of this study was to determine the prevalence of the missing mandibular first molar teeth and habit analysis in 15-17 year old students in Calicut district. The city of Calicut, the Anglicized form of Kozhikode, is the headquarters of the district. It was the capital of the erstwhile kingdom of the mighty Zamorins and once a renowned commercial center. The district of Kozhikode is 38.25% urbanised and its further subdivision into 4 Taluks namely, Kozhikode, Vadakara, Koyilandy and Thamarassery came into effect from 2001.

Materials and Methods

This cross sectional study was part of a prevalence study on dental caries done in 15-17 year old students in Calicut district. The Government higher secondary schools in the district were grouped under the four taluks, Calicut, Koyilandy, Vadakara and Thamarassery respectively. Then the schools were further subgrouped under two strata: urban and rural for all the four taluks. In each taluk, two schools each were selected under urban and rural criteria based on simple random sampling (lottery method). Thus, a total of sixteen schools were selected.

Sample size was calculated on the basis of a previous study using the formula:

$$N = 4pq/d^2$$

p =prevalence in an earlier study (50.6) q= 100-p ,
d= effect size 5 n=399.9 rounded to 400)

According to this formula, the sample size in each group (urban and rural) was calculated as 400 each ie 800 school children in one taluk. Total sample size for the four taluks together was 3200.

Institutional Ethical Committee clearance was obtained. Permission was obtained from Principals of the respective schools participating in the study and written consent was obtained from the students participating in the study.

Data collection was carried out by means of clinical examination and structured questionnaire. Participants underwent intraoral examinations performed by a five trained dentists and they had to answer a questionnaire pertaining to their oral hygiene behaviors and dietary habits.

The survey sheet also collected information on age, gender, oral hygiene behaviours such as frequency of cleaning teeth, type of dentifrice used, and use of toothbrush in cleaning. Information about daily habits such as frequency of consuming sweetened tea, snacking in between meals will also be recorded. Then all the survey sheets were numbered and bundled according to the respective schools, and the bundles were also given numbers. These bundles were further segregated according to rural and urban areas. Then 1600 survey sheets each was selected from urban and rural areas each to get the required sample size 3200

Statistical Analysis

All the data was entered in SPSS (18) software both descriptive and analytic approaches was used in data analysis. Mean and standard deviation was calculated for quantitative variables and frequency for qualitative variables. The prevalence was expressed in percentage. Chisquare test was used to compare sociodemographic characteristics and risk factors (oral hygiene practises and personal habits). The level of statistical significance was be set at p<0.05

Results

Table 1: Prevalence of missing mandibular molars in various taluks - urban versus rural

Taluk	Total	Total Mandibular molar Missing	
		Missing	Prevalence (%)
Kozhikode urban	400	11	2.75
Kozhikode rural	400	5	1.25
Koyilandy urban	400	8	2
Koyilandy rural	400	18	4.5
Vadakara urban	400	24	6
Vadakara rural	400	24	6
Thamarassery urban	400	12	3
Thamarassery rural	400	19	4.75
Total	3200	121	3.78

Table 2: Prevalence of missing mandibular molars in various taluks

Taluk	Total	Total mandibular molar missing	
		Missing	Prevalence(%)
Kozhikode	800	16	2
Koyilandy	800	26	3.25
Vadakara	800	48	6
Thamarasery	800	31	3.88
Total	3200	121	3.78

Table 3: Prevalence of missing mandibular molars in urban versus rural in Calicut district

Region	Total	Total mandibular molar missing	
		Missing	Prevalence (%)
Urban	1600	55	3.44
Rural	1600	66	4.13
Total	3200	121	3.78

The results of Table 1 shows a higher prevalence rate of missing mandibular molars in Vadakara (urban and rural 6% each) followed by Thamarassery rural area (4.75%) when compared to the other taluks. Table 2 also shows a higher rate of missing mandibular molars in Vadakara taluk when compared to the other three taluks in Calicut district. Table 3 shows a higher prevalence rate of missing mandibular molars in rural areas (4.13%) compared to urban areas (3.44) in Calicut district.

Table 4: Prevalence of missing mandibular first molar and its significance

Variables	First mandibular molar present		First mandibular molar missing		Significance p value
	Frequency	Percentage %	Frequency	Percentage %	
Gender					
Male	1475	96.5	52	3.41	0.287
Female	1604	95.8	69	4.12	
Age Group					
15 years	404	95.5	19	4.49	0.696
16 years	1517	96.2	59	3.74	
17 years	1158	96.4	43	3.58	
Brushing Aids					
Finger	33	94.2	2	5.71	0.787
Brush	3043	96.2	119	3.76	
Others	3	100	0	0.00	
Frequency of brushing					
Once	1364	96.3	52	3.67	0.501
Twice	1707	96.1	68	3.83	
Between meals	8	88.9	1	11.11	
Use of Mouthwash					
Yes	256	98.4	4	1.54	0.048
No	2823	96.02	117	3.98	
Snacking between meals					
Yes	1708	96.4	63	3.56	0.46
No	1371	95.9	58	4.06	
use of panmasala					
Yes	23	100	0	0.00	0.34
No	3056	96.2	121	3.81	
Use of soft drinks					
Once a day	252	94.4	15	5.62	0.074
Once a week	1699	95.9	72	4.07	
No usage	1128	97.0	34	2.93	

The breakdown tabulations in Table 4 shows that the prevalence of missing molars was statistically significant in relation to usage of mouthwash as the p value was less than 0.05. There was a higher prevalence of missing molars in subjects who did not use mouthwash (3.98) when compared to those who used mouth wash (1.54)

Table 5: Frequency of individual tooth loss

	Missing lower molar		
	Frequency	Percentage	Cumulative Percentage
Both 46 and 36 present	3079	96.2	96.2
Missing 46	51	1.6	97.8
Missing 36	54	1.7	99.5
Both 46 and 36 missing	16	0.5	100
Total	3200	100	

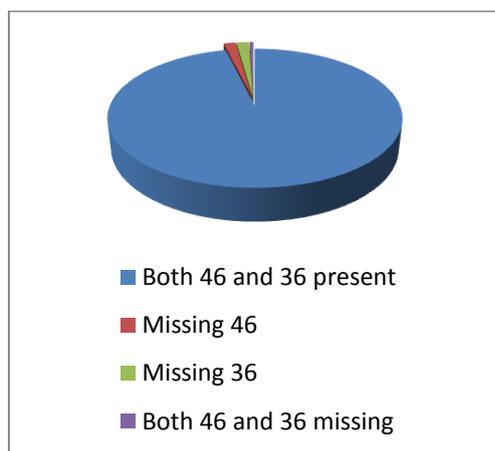


Figure 1: Distribution of tooth loss between right and left

Table 5 and Figure 1 shows that in the sample studied, the left mandibular molars loss was slightly higher than right mandibular molars and only 0.5% had both right and left first mandibular molars missing. Majority of the subjects (96.2%) had both tooth number 46 and 36 present.

Discussion

Loss of first permanent molars negatively affects both arches and has adverse effects on occlusion. It has been reported that early loss of these teeth results in tilting of neighboring teeth to hollow spaces, supra-eruption of the teeth in the opposite arch, unilateral chewing, a midline shift and dental malocclusion. However, permanent first molar teeth have been characterized as the most caries-prone teeth in the mixed dentition.⁽⁶⁾

The prevalence of missing first mandibular molars in Calicut district among the age group of 15-17 year old school children was found to be 3.78%. This is comparatively less as compared to the study done in Dakshina Kannada population (44.3%) by

Namrada et al.⁽⁷⁾ This wide difference may be because the study in Dakshina kannada population was conducted in four age groups <20; 20-30:30-40;40-60;>60 while our study was conducted in age groups 15-17 years. Within the age group, 20 years in Namrata et al study the percentage of missing molars was 8.40% which is also higher than our study. Another study by Alves et al⁽⁸⁾ among 12-year old schoolchildren from South Brazil, the researchers observed that tooth loss rate in 1,528 patients was 5.81%. Another study by George et al⁽⁹⁾ reported that rates of all missing permanent teeth in children and young people of ages 6, 12 and 15 years were 5.7% 22% and 28.3%, respectively. These rates were higher than in the present study because they had included all permanent teeth.

In our study the prevalence of missing mandibular molar was more in rural (4.13%) compared to urban area (3.44%). Similar results were obtained by Namrata et al⁽⁷⁾ (2018)where prevalence of loss of first molars was more commonly seen in patients from rural areas (49%) as compared to urban areas (17.2%). The reason may be the fact that patients from rural areas are more negligent towards dental disease as opposed to those that live an urban lifestyle.

Out of the total 1527 males and 1673 females in the population, 52 males (3.41%) and 69 females (4.12%) have missing mandibular first molars respectively. An association between gender and prevalence of loss of permanent first molars could not be statistically established (p=0.287). These findings are in agreement to the study by, Shigli K, Hebbal M, Angadi GS⁽¹⁰⁾ were the loss of first molars is more prevalent in females (26.5%) when compared to males (15%).

Another study by Demirbuga et al.⁽¹¹⁾ reported that of the 15,008 teeth examined in the boys group, 1.84% (276) were missing, and in the girls group comprising of 16,572 teeth, 347 (2.09%) teeth were missing. In contradiction to our findings males showed more prevalence of missing molars in the studies done by Namrata et al⁽⁷⁾ (2018) and Locker D,et al⁽¹²⁾

Bhat et al.⁽¹³⁾ reported that the percentages of extracted teeth in males were 53.1% and in females were 46.9%. Another study by Jafarian and Etebarian⁽¹⁴⁾ assessed that males comprised 48.7% of patients, but they had more extracted teeth (56.1%) than females (43.9%).

Within the age groups it was noted that the prevalence of missing mandibular molars are more in the 15 year age group (4.49%) and the prevalence decreased as age increased. Contradictory findings were observed in the study conducted by Hegde et al.⁽¹⁵⁾ where the loss of first molar was seen significantly from the age range of 36-45 (47.39%) years and prevalence increased as the age advances. Studies done by Susin et al.⁽¹⁶⁾ 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.

It was claimed that hand selection when tooth brushing may affect rates of extraction on left or right sides of the oral cavity⁽¹¹⁾. In the sample studied, the left mandibular molars loss was slightly higher than right mandibular molars. This may be attributed to faulty brushing techniques employed. This is similar to the study done by Demirbuga et al.⁽¹¹⁾ who reported that right side missing teeth numbered to 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.

Within the habits, prevalence of missing molars was more in the group which did not use mouth wash and it was statistically significant as the p value was less than 0.05. This might be due to the ignorance of the benefits of mouthwash usage. The prevalence of missing molars was less in subjects who did not use soft drinks (2.93) when compared to those who used soft drinks once a week (4.07) and those who used once a day (5.62). This might be due to the sugars and acids present in the soft drinks which caused the decay.

Summary

When prevalence for missing mandibular molars was analyzed the findings are as follows:

- The prevalence of missing molars in Calicut district in the age group of 15-17 years was 3.78%.
- Higher prevalence rate of missing mandibular molars was seen in Vadakara (urban and rural 6% each) followed by Thamarassery rural area 4.75% when compared to the other taluks.
- Higher prevalence rate of missing mandibular molars was more in Vadakara taluk when compared to the other three taluks in Calicut district.
- Higher prevalence rate of missing mandibular molars in rural areas (4.13%) compared to urban areas (3.44) in Calicut district
- The prevalence of missing mandibular molars was more in subjects who did not use mouth wash, this finding was statistically significant as the p value was less than 0.05
- In the sample studied, the left mandibular molars loss was slightly higher than right mandibular molars.

Conclusion

The prevalence of missing molars in Calicut district in age group of 15-17 years is 3.78%. Higher prevalence rate of missing mandibular molars in rural areas (4.13%) was noted compared to the urban areas (3.44) in Calicut district. Hence, the need for oral health education and awareness is very crucial amongst the Indian population to prevent loss of teeth that is very crucial to the maintenance of occlusion in the oral cavity

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