

Primary vs. Permanent Teeth: Survey on Parents' Ability in Understanding the Difference

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Abstract

Aim: to inspect the extent to which parents can differentiate between their children's primary and permanent teeth in mixed dentition.

Methods: One hundred parents (77 mothers, 23 fathers) and their children (n=100; mean age=7.6±1.13 years old) were included in this study. All the children were examined, and their decayed, missing, and filled primary and permanent values and decayed, missing, and filled primary surface and permanent surface values were recorded. Parents were asked whether each of their children's 12 teeth on the maxillary and mandibular right side was a primary or permanent tooth. Each of their answers was recorded as zero (incorrect answer) or one point (correct answer), and the total score was calculated.

Results: One-third (33 percent) of the parents stated that the permanent first molar (PFM) was a permanent tooth, 59.3 percent said it was a primary tooth, and 7.3 percent said they had no idea. The median value of the total correct answer for the 12 teeth was 10. There were no statistically significant differences among the parents' total correct scores according to the sociodemographic status (P>0.05).

Conclusion: Very few parents were able to distinguish between the permanent and the primary teeth. They have insufficient knowledge about their children's teeth, especially about PMFs and to educate them regarding this should be of utmost importance.

Keywords: primary teeth, permanent teeth, permanent first molar, pediatric dentistry, oral health literacy.

Introduction

Dental caries is a multifactorial disease, which depends on various factors, predominantly on the presence of fermentable sugar, host factors, presence of cariogenic microbial flora, and other associated environmental factors. Though a lot of steps have been taken to protect the pediatric patient's oral and dental health, still it persists as a public health concern in the 21st century. Since young children might not be able to understand the importance of oral health and may not brush their teeth properly, oral care then becomes the responsibility of their parents'.

Primary teeth are essentially placeholders for permanent adult teeth. Hence, their protection is of utmost importance. Pediatric Dentist counsels the parents regarding correct oral hygiene measures including age-defined brushing technique, sealant placement and diet counselling. Permanent first molars (PFMs) usually erupt without any adverse effects in the posterior region of the dental arch; thus, parents are not informed regarding their eruption.

This makes the parents consider it as a primary tooth that would eventually exfoliate. A high incidence of caries in PFMs makes premature extraction of these teeth common.[1]

PFMs are predisposed to caries at an early age due to several factors like presence of grooves on the occlusal surfaces, lack of poor oral hygiene and consumption of sugar products. PFMs perform important functions like mastication, maintenance of vertical facial height, balance of occlusion in maxillofacial trauma and orthodontic treatments. Early extraction of PFMs can cause problems, such as tipping of the adjacent teeth to the extraction area, over eruption of the opposing teeth, shift of the midline to the extraction space, asymmetric or unilateral chewing habits, and periodontal problems caused by the loss of alveolar bone at the extraction site.[2] Thus, eliminating risk factors for dental caries and raising parents' awareness of the importance of PFMs are essential steps in maintaining oral health.

The purpose of this study was to investigate the extent to which parents can differentiate between

primary and permanent teeth of their children in the mixed dentition period.

Methods

The study is a cross-sectional observational study. Parents of children treated in the Department of Pediatric Dentistry, Rama Dental College, Hospital & Research Centre, and Kanpur, India were invited to participate in this study. Data were collected from January 2021 to March 2021. A sample size of 150 parents was selected.

The survey included parents of children who had a PFM in each of their four quadrants, were in the mixed dentition period and had no medical problems. Only one parent was allowed to participate per child, after signing an informed consent.

A questionnaire consisting of three sections was created for the parents to complete. The first section of the questionnaire included the sociodemographic status of the parents (five items) and children (four items). Furthermore, the findings of the children's oral clinical examination (three items: the number of teeth in the mouth, their decayed, missing, and filled primary (DMFT) and permanent (DMFT) scores and decayed, missing, and filled primary surface (DMFS) and permanent surface (DMFS) scores were recorded by two experienced pediatric dentists. Both investigators performed the oral examination twice, one week apart, for 15 randomly selected children and recorded their DMFT scores. The kappa (κ) statistic was used to evaluate inter- and intra-examiner agreement. The dmft and DMFT scores and the dmfs and DMFS scores were combined in mixed dentition.

The second section included questions about the eruption/exfoliation periods of primary and permanent teeth (five items).

The third section contained questions about whether each of the children's 12 teeth on the maxillary and mandibular right side was primary or permanent (12 items), using a dental light and a dental mirror and probe. If a tooth was absent on the right side, the question was asked regarding the symmetrical tooth on the left side. The total correct answer score was calculated from the sum of the parents' correct answers to the questions about their children's 12 teeth. It was assessed using a scoring system that assigned one point for each correct answer and no point for wrong answers, with a maximum possible score of 12 points. The theoretical range was zero (no knowledge) to 12 (excellent knowledge). The maximum value was considered "excellent knowledge". The reliability of the second and third sections (five items in the second section, 12 items in the third section, 17 items in total) was assessed with

test-retest reliability. For reliability analysis, 15 parents who were selected randomly completed the questionnaire twice at a one-week interval and then were excluded from the study sample.

Statistical Analysis

The data obtained were analyzed using IBM SPSS Statistics for Windows, version 22.0 (IBM, Armonk, N.Y., USA). Test-retest reliability was assessed using the kappa statistic. The Kolmogorov-Smirnov test was performed to test the normality of the data. Since the results of the test showed an abnormal distribution, the Mann Whitney-U and Kruskal-Wallis tests were used to compare the correct answer scores among sociodemographic status. Spearman's correlation coefficient was used to calculate the correlation between dmft/DMFT and dmfs/DMFS scores and the total correct answer score. Moreover, an estimated regression equation with multiple linear regression analysis was constructed to model the relationship between dependent variable (total correct answer scores of the parents) and independent variables (parents' sex, age and educational status, place of residence, income, children's order of birth, children's dmft/DMFT scores, and children's dmfs/DMFS scores). The significance level was accepted as $P < 0.05$.

Results

The inter-examiner kappa coefficient was 0.97 and the intra-examiner coefficients were 0.98 and 0.97 for each investigator. The kappa coefficient for the second and third sections of the questionnaire was 0.84 ($\kappa > 0.75$ was considered a good agreement). Hence, the questionnaire on the eruption/exfoliation periods of primary and permanent teeth and distinguishing between primary and permanent teeth was reliable. The mean age of the children who participated in the study was 7.6 ± 1.13 years (range = six to 10 years), and the mean age of the parents was 34.76 ± 4.48 years (range = 24 to 47 years). The demographics of the parents and children and the children's oral clinical findings are presented in Table 1.

Table: 1 Sociodemographic Status of the Parents/Children and Findings of the Children’s Oral Clinical Examination

Sociodemographic Status	N	%
Parents		
Age mean±SD* (range)	34.76±4.48	8 (24-47) years
Sex		
Female	107	71.3
Male	43	28.7
Education		
Primary School	48	32
Secondary School	27	18
High School	40	26.7
University	29	19.3
Post graduate	6	4
Place of Residence		
City	127	84.7
Suburb	23	15.3
Family Monthly Income		
Low (2.5-5 lakh)	58	38.7
Medium (5-10 lakh)	72	48
High (above 10 lakh)	20	13.3
Children		
Sex		
Female	71	47.3
Male	79	52.7
Age (years)		
6	28	18.7
7	46	30.7
8	42	28
9	26	17.3
10	8	5.3
Number of Siblings		
1	7	4.7
2	87	58.0
3	48	32.0
4	7	4.7
5	1	7.0
Order of Siblings		
First	63	42
Second or higher	87	58

Children’s oral findings		
Number of teeth	22.4±2.01	23 (14-24)
dmft/DMFT	8.34±11.32	8 (0-19)
dmfs/DMFS	19.6±3.55	8.5 (0-55)

SD=standard deviation; dmft/DMFT=decayed, missing, filled teeth (primary/permanent); dmfs/DMFS = decayed, missing, filled surfaces (primary/permanent).

In the children’s oral examination, the mean combined dmft/DMFT score was found to be 8.34±11.32. The percentage of the parents’ correct answers about the eruption time of primary and permanent teeth is presented in Table 2. Most parents (68 percent) reported that the first primary teeth erupted around six months to one year old. Almost 50 percent reported that the mandibular anterior incisors were the first teeth to erupt and 56 percent reported they did not know when primary teeth completed eruption. Fifty percent of the parents did not know when a permanent tooth erupted, and 54.7 percent had no knowledge about which permanent tooth erupted first. The percentage of the parents’ correct tooth identification is presented in Table 3.

Table 2: Parents’ Correct Answers about the Eruption/Exfoliation Timing of Primary and Permanent Teeth

Questions	N	(%)
Q1. At what age do the first primary teeth erupt?		
6 months to 1 year	102	68%
2 years	6	4%
3 years	24	16%
Do not know	18	12%
Q2. Which primary teeth erupt first?		
Mandibular central incisors	71	47.3%
Other	31	20.7%
Do not know	48	32%
Q3. When does the eruption of primary teeth compel		
1 year	8	5.3%
2 years	15	10%
3 years	17	11.3%
4 years	10	6.7%
5 years	9	6%
6 years	7	4.7%
Do not know	84	56%

Q4. When does the first permanent tooth erupt?		
4 years	6	4%
5 years	10	6.7%
6 years	22	14.7%
7 years	33	22%
8 years	1	0.7%
Other	3	2%
Do not know	75	50%
Q5. Which permanent tooth erupts first?		
Mandibular central incisors*	25	16.7%
Maxillary central incisors	32	21.3%
Permanent first molars*	9	6%
Premolars	2	1.3%
Do not know	82	54.7%

The median value of the correct answers for the 12 teeth was 10. The percentage of the parents who knew that PFM was a permanent tooth was 33.3 percent in the maxilla and 32.7 percent in the mandible; 34.6 percent of mothers and 30.2 percent of fathers knew that it was a permanent tooth. The percentages of the parents who did not know that PFM was a permanent tooth and who had no knowledge about PFM were 60 percent and 6.7 percent in the maxilla, respectively, and 60 percent and 7.3 percent in the mandible, respectively. Of the parents who knew that PFM was a permanent tooth, 43 percent also said that primary molars were permanent teeth.

Table 3. Parents' Correct Tooth Identification, With Mean ±SD* and Median (min-max) Values								
Maxillary Right Teeth								
Primary Teeth	Tooth	2nd Molar	1st Molar	Canine	Lateral Incisor	Central Incisor		
	Correct	116 (78.9)	121 (82.3)	128 (85.9)	64 (94.1)	34 (100)		
	Total	147 (100)	147 (100)	149 (100)	68 (100)	34 (100)		
Permanent Teeth	Tooth	PFM* *	2nd Premolar	1st Premolar	Canine	Lateral Incisor	Central Incisor	
	Correct	50 (33.3)	–	1 (33.3)	1 (100)	82 (100)	116 (100)	
	Total	150 (100)	–	3 (100)	1 (100)	82 (100)	116 (100)	
Primary/Permanent Teeth	Tooth	PFM	Primary Molar 2nd Molar /2nd Premolar	1st Molar/ 1st Premolar	Canine	Lateral Incisor	Central Incisor	
	Correct	50 (33.3)	116 (77.3)	122 (81.3)	129 (86)	146 (97.3)	150 (100)	
	Total	150 (100)	150 (100)	150 (100)	150 (100)	150 (100)	150 (100)	

Mandibular Right Teeth							
Primary Teeth	Tooth	2nd Molar	1st Molar	Canine	Lateral Incisor	Central Incisor	
	Correct	114 (76)	122 (81.3)	131 (87.3)	34 (85)	9 (50)	
	Total	150 (100)	150 (100)	150 (100)	40 (100)	18 (100)	
Permanent Teeth	Tooth	PFM**	2nd Premolar	1st Premolar	Canine	Lateral Incisor	Central Incisor
	Correct	49 (32.7)	-	-	-	111 (100)	133 (100)
	Total	150 (100)	-	-	-	111 (100)	133 (100)
Primary/Permanent Teeth	Tooth	PFM	Primary Molar 2nd Molar /2nd Premolar	1st Molar /1st Premolar	Canine	Lateral Incisor	Central Incisor
	Correct	49 (32.7)	114 (76)	122 (81.3)	131 (87.3)	145 (96.6)	142 (94.6)
	Total	150 (100)	150 (100)	150 (100)	150 (100)	150 (100)	150 (100)
Correct Answer Scores	Mean ±SD	Median (min-max) Parents with excellent knowledge (%) †			Parents with excellent knowledge (%) †		
Teeth other than PFMs (in a scale of 0-10)	8.78±2.02	10 (2-10) 65.3			65.3		
PFMs (teeth number 3 and 30) (in a scale of 0-2)	0.66±0.94	0 (0-2) 32.7			32.7		
Total (in a scale of 0-12)	9.44±1.90	10 (4-12) 14.7			14.7		

* SD=standard deviation.

** PFM=permanent first molar.

‡ The maximum value of the scale was considered “excellent knowledge”.

The total correct answers about identification of primary and permanent teeth in relation to sociodemographic status are presented in Table 4. There were no statistically significant differences among the parents’ total correct scores according to the sociodemographic status (P>0.05). There was no statistically significant difference between parents who knew and parents who did not know that PFM was a permanent tooth in terms of the number of carious PFMs in their children’s mouth (P>0.05). The mean (SD) and median (min-max) of caries in PFMs were 1.10 (1.44) and 0 (0-4), respectively. The percentage of caries in PFMs was 27.5 percent.

Multiple regression was used to predict the value of a dependent variable (the parents’ correct answers distinguishing between primary and permanent teeth) based on the value of eight independent (predictor) variables (Table 5). We found that the predictive power on total correct answer scores of the variable “children’s dmft/DMFT scores” was stronger than the other variables (β =0.153). The predictive power of these eight variables on total correct answer scores was 0.3 percent (adjusted R2=0.003). Neither dmft/DMFT nor dmfs/DMFS was correlated with the total correct answer score (r=0.097, P=0.236; r= -0.012, P=0.889, respectively).

Table 4. Mean (SD)* and Median (min-max) Values of the Correct Permanent First Molar (PFM) Identification In Relation To Parents' Sociodemographic Characteristics								
	Correct answer scores of PFMs				Total correct answer scores			
	Mean (SD)*	Median (min-max)	Test Statistic	P-value	Mean (SD)	Median (min-max)	Test Statistic	P-value
Sex								
Female	0.68 (0.95)	0 (0-2)	U†=2.207.000	0.635	9.62 (1.78)	10 (4-12)	U=1.905.000	0.075
Male	0.61 (0.95)	0 (0-2)			8.98 (2.13)	10 (4-12)		
Education								
Primary School	0.46 (0.85)	0 (0-2)			9.17 (2.00)	10 (4-12)		
Secondary School	0.96 (1.02)	0 (0-2)			9.74 (1.72)	10 (5-12)		
High School	0.83 (0.98)	0 (0-2)	$\chi^2^{**}=9.359$	0.053	9.65 (2.01)	10 (4-12)	$\chi^2=3.233$	0.52
University	0.62 (0.94)	0 (0-2)			9.21 (1.93)	10 (5-12)		
Post-Graduation	0.00 (0.00)	0 (0-0)			10.00 (0.00)	10 (10-10)		
Place of Residence								
City	0.67 (0.94)	0 (0-2)	U=1.414.000	0.767	9.37 (1.94)	10 (4-12)	U=1.591.000	0.46
Suburb	0.67 (0.94)	0 (0-2)			9.83 (1.64)	10 (4-12)		
Income								
Low	0.62 (0.93)	0 (0-2)			9.47 (1.89)	10 (4-12)		
Medium	0.65 (0.94)	0 (0-2)	$\chi^2=0.543$	0.762	9.36 (2.05)	10 (4-12)	$\chi^2=0.024$	0.988
High	0.80 (1.01)	0 (0-2)			9.65 (1.39)	10 (7-12)		
Child'S Order Of Birth								
1st	0.65 (0.94)	0 (0-2)	U=2.755.000	0.946	9.44 (1.83)	10 (4-12)	U=2.749.000	0.972
2nd or Other	0.67 (0.95)	0 (0-2)			9.44 (1.96)	10 (4-12)		

Table 5: Results of Multiple Linear Regression Analysis for Prediction of Total Correct Answer Scores in Parents

Total correct answer score*	B	SE B**	β **	t	P-value†
(Constant)	9.951	1.68		5.922	<0.001
Parents' sex‡	-0.692	0.364	-0.165	-1.903	0.059
Parents' age‡	-0.03	0.035	-0.072	-0.859	0.392
Parents' educational status‡	0.183	0.158	0.119	1.161	0.248
Place of residence‡	0.518	0.46	0.098	1.125	0.263
Income‡	0.008	0.27	0.003	0.03	0.976
Children's order of birth‡	0.043	0.321	0.011	0.134	0.894
Children's dmft/DMFT scores‡	0.082	0.076	0.153	1.072	0.285
Children's dmfs/DMFS scores‡	-0.019	0.024	-0.112	-0.772	0.441
Model summary	R	R²		Adjusted R² **	SEE**
	0.237	0.056		0.003	1.89916

Discussion

When parents understand that permanent teeth will remain in the mouth for a lifetime and that they will not be replaced if lost, they may become motivated to give the utmost importance to those teeth. Previous studies have evaluated parents' knowledge about oral health and their attitudes and behaviors concerning their children's oral health.^{3,4} However, in this study, unlike previous ones, we evaluated the extent to which parents could distinguish between primary and permanent teeth in the mixed dentition period as well as the effect of their knowledge on their children's oral health. We also evaluated parental knowledge about all the teeth in mixed dentition stage, which was not done in studies regarding PFMs. The results of this study showed that parents had little knowledge about PFMs and the eruption period of primary and permanent teeth. Forty-eight percent of parents reported that the mandibular anterior incisors were the first teeth to erupt; seven percent stated that they were PFMs. Since both cases are possible according to literature both options were considered correct in the questionnaire. In this study, the parents' level of distinction between primary and permanent teeth other than PFMs was acceptable. The median value of the correct answer score for these teeth other than PFMs was 10 (in a scale of 0–10). The percentage of excellent scores (i.e., a score of 10) was 65.3 percent, representing more than half of the parents. However, this acceptable level of knowledge was not seen related to PFMs. Only one-third of the parents knew that PFMs were permanent teeth. Almost half of those who had this knowledge also

said that primary molars were permanent teeth. Thus, according to them, all molars on the dental arch were permanent teeth. Turkish children have a high incidence of caries in PFMs. In the authors' previous study²¹ conducted on 5,996 PFMs in 1,499 children, the percentage of caries-free PFMs was 45.7 percent. In this study, the percentage of caries-free PFMs was 72.5 percent.

The reason for this difference may be that children in the present study were younger. Therefore, caries had not developed yet. Luca et al.⁵ reported that approximately half of the mothers admitted that they did not know about the eruption age of PFMs. A significant relationship was found between the mothers' level of education and correct knowledge about the eruption time of PFMs, with those having higher education being more knowledgeable. The researchers stated that only 21.3 percent of the mothers responded that PFMs were permanent teeth. However, approximately 50 percent stated they had not received any information about eruption time. The remaining 50 percent received information from the dentist (18 percent), mass media (18 percent), or other doctors (eight percent). In their study, Vejdani et al. reported that 67.7 percent of the parents were aware of the presence of PFMs but only 27.3 percent of them had correct knowledge about the eruption age of PFMs. Knowledge of the eruption age of PFMs was significantly correlated with the fathers' level of education but not the mothers', which was in agreement with the studies by Zouashkiani and Mirzakhani and Heydari et al. Interestingly, despite the small sample size, none of our parents who had a postgraduate degree knew that PFM was a permanent

tooth. In this study, none of the parents' sociodemographic characteristics had a statistically significant effect on their awareness of distinguishing between primary and permanent teeth. In our study, children whose parents were aware of the presence of PFMs had an average of 1.44 carious PFMs, while those whose parents thought that PFMs were primary teeth had an average of 0.88 carious PFMs. The children whose parents did not know about PFMs had an average of 1.30 carious PFMs. Fallahzadeh et al. showed that occlusal caries in PFMs decreased as the parents' level of education increased. Given the important role of PFMs in occlusion, mastication and the integrity of the dental arch, the researchers demonstrated that parents should be educated about the eruption age of PFMs. In a study conducted by Jetpurwala et al., 67.5 percent and 72.4 percent of the parents, respectively, responded correctly about the number of primary teeth and permanent teeth. When the parents were asked about the chronology of tooth eruption, 53.9 percent stated that PFMs erupted between the ages of 10 and 12 years. Forty-five percent accepted extraction of PFMs, considering them to be primary teeth, since they thought it was unnecessary to treat dental caries in primary teeth. In this study, parents were asked whether the child who participated in the study was the first born in the family. The reason why this question was asked was that, even if the parents did not know about their first child's dentition, they might have gained experience in the subsequent children. However, that did not have a statistically significant correlation with the parents' level of knowledge about PFMs. This shows the importance of anticipatory guidance when the child is approaching eruption of permanent teeth. The primary limitation of our study was the small sample size.

Conclusions

The teeth that parents have the most difficulty distinguishing were PFMs. Based on the results of this study, it can be concluded that the parents did not have enough knowledge about distinguishing between primary and permanent teeth regardless of the socio demographic characteristics.

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