The Associated Factors of Permanent First Molar Caries in 7-9 Years Old Children

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Abstract

Introduction: Permanent first molar is the most important unit in the chewing system. Early loss of first molars can significantly reduce chewing efficiency, increase overbite, lead to premature eruption of the permanent second and third molars, and displacement of adjacent teeth.

The purpose of this study was to determine the associated factors of permanent first molar caries in 7-9 years old children in Rasht, in 2014.

Materials and Methods: This cross-sectional comparative study was performed on 190 children 7 to 9 years old. Examination was carried out by one examiner in the pediatric department, with disposable mirror and explorer and under the light of dental unit. A self-administered questionnaire was completed by parents before the examination, containing an informed consent, demographic data and information about tooth brushing and dietary habits. Data were statistically analyzed using independent t-test and chi-square tests.

Results: There was a significant relationship between the permanent first molar caries and dmft index (p = 0.001), mean plaque index (p = 0.001), consumption of between meal snacks three times a day (p = 0.046), using of sugar-containing drinks before bedtime (p = 0.048) and the age tooth brushing had started (p=0.027). There was no significant association between socio-demographic factors, frequency and method of tooth brushing and the permanent first molar caries.

Conclusion: High dmft and plaque index, consumption of between meal snacks and using sugary drinks before sleep increases the risk of permanent first molar caries.

Key words: • Dental Caries •Dental Plaque •DMF Index •Molar

Introduction

Dental caries is a process caused by an imbalance in the interaction between the tooth surface/subsurface and the adjacent microbial biofilm. The imbalance is manifested as cumulative demineralization of the tooth.[1] One of the important factors in development of dental caries in permanent teeth, is false belief of parents about primary teeth and eruption of permanent teeth especially the permanent first molar that erupts at the age of six.[2]

Permanent first molar is the main tooth in the upper and lower jaw. Some of the important roles of this tooth is supporting the muscles and maintaining the vertical height, determination of the occlusal relationship in vertical plane, distribution of forces and guiding the eruption of other permanent teeth. Due to its specific morphological properties and early exposure to the oral cavity, it is susceptible to caries and has the highest prevalence of caries in permanent teeth. On the other hand, simultaneous presence of this tooth and primary teeth in the oral cavity, leading to negligence in its maintenance. The early loss of permanent first molar can cause a lot problems including localized reduction in mastication forces, osteoporotic changes in the trabecular bone of the jaw, premature eruption of permanent second and third molars, increased overbite and displacement, tilting and rotation of adjacent teeth.[3]

It is well established that the caries status in the young permanent dentition is related to the corresponding status in the primary dentition and when caries is established, past caries experience remains the most powerful known single predictor of future caries in the young permanent dentition. [4] There is abundant epidemiological evidence that dietary sugars are the major dietary factor affecting dental caries prevalence and progression. Sucrose seems to be the most cariogenic sugar, not only because of its acidogenic metabolism, but also because Mutans Streptococci utilize this sugar to produce the extracellular polysaccharide glucan.[5]

This is evident that oral hygiene habits, the presence of visible plaque and social factors can play important role in the first permanent molar caries. Fallahzade et al. found that there is a relationship between occlusal decay of the permanent first molar and DMFT, dmft and consumption of sugar rich refreshments more than twice a day.[6] Rosado et al. observed that associated variables to dental caries in both dentitions are presence of enamel defects, presence of dental plaque, low socio economic status, female sex, and older age. Mother's schooling was negatively associated with caries in primary dentition. Caries experience in the primary dentition was positively associated with caries in the permanent dentition.[7] According to J. Vanobbergen et al. none of the socio-demographic and behavioral variables had enough predictive power at community level to be useful in identifying caries susceptible children.[8]

The aim of this study was to find whether dmft, oral hygiene and dietary habits of children with caries in permanent first molars are different from those with healthy first molars?

Materials and Methods

This cross-sectional comparative study was carried out on 190 children 7 to 9 years old referred to Department of pediatric dentistry at Guilan faculty of dentistry.

Ninety five children with caries in the first molars and ninety five children without first molar caries were selected. A self-administered questionnaire was completed by parents before the examination including informed contest, demographic information (age, sex) and information about tooth brushing habits, frequency of sugar-con-

taining snacks consumption per day, parent's educational level and mother's job.

Clinical examination was performed using disposable dental mirror and explorer under the light of dental unit.

For each child, the presence or absence of caries in permanent first molars was recorded and molars with fissure sealant, hypoplasia and restoration excluded from study. Plaque index (Silness-Löe) and dmft index were also recorded.

Data were analyzed using Chi-square test and Independent t-test in the statistical analysis program SPSS 21. The level of significance was set at P< 0.05.

Results

In this study 190 children with the mean age of 8.07±0.72 years, were examined (106 girls and 84 boys) consisted 95 children in healthy group (without caries in permanent first molars) and 95 children with caries in the permanent first molars.

The dmft index in the healthy group and in children with first molar caries was 3.25 ±3.01 and 6.8±2.36 respectively. The mean plaque index in children with the first molar caries was 1.18±0.45 and in the healthy group was 0.91±0.46 (table1).

Independent t-test showed a significant relationship between these indices and first permanent molar caries.

Chi-square test, showed a significant relationship between consumption of snacks more than three times a day (P=0.046) and using drinks containing sugar before sleep and permanent first molar caries. (p=0.048)

Statistical analysis showed a significant relationship between the age tooth brushing started and the first permanent molar caries.(P=0.027) (table 2) but there was no significant association between frequency of sugar-containing snacks, frequency and method of tooth brushing and the first permanent molar caries. There was no significant association between socio-demographic factors (parent's education and numbers of

children) and the permanent first molar caries.

Table 1. Plaque indices dmft and in studied children

Frist Moler Caries Indices	Yes mean±SD	No mean±SD	P-value
d	4.92±2.59	2.26±2.59	0.001
m	0.83±1.49	0.34±0.63	0.001
f	1.06±1.83	0.65±1.37	0.001
dmft	6.80±2.36	3.25±3.01	0.001
Plaque index	1.18±0.45	0.91±0.46	0.001

Table 2. Dietary and tooth brushing habits in studied children

Frist Moler Caries variables		Yes N(%)	No N(%)	P-value
Frequency of between-meal snacks	≥3 times a day	34 (35.8)	18 (18.9)	
	2 times a day	47 (49.5)	65 (68.5)	0.046
	Once day	12 (12.6)	10 (10.5)	
	Never	2 (2.1)	2 (2.1)	
Sugar-containing drinks before sleep	Yes	25 (26.3)	14 (14.7)	0.048
	No	70 (73.7)	81 (85.3)	
The age tooth brushing started	≥5 years	17 (17.9)	14 (14.7)	
	3-5 years	33 (34.7)	21 (22.1)	0.027
	2-3 years	38 (40)	45 (47.4)	
	≤2years	7 (7.4)	15 (15.8)	

Discussion

The present study was performed with the aim of evaluating the factors associated with the permanent first molar caries. There was a significant relationship between dmft and the first permanent molar caries. It is simil-

lar to the findings of Rosado et al[7] and Raadal et al. [9] Li et al. showed that children having caries in their primary teeth were three times more likely to develop caries in their permanent teeth.[10] According to the definition of dental caries as an infectious disease that can spread to other teeth, increasing the number of dental caries in primary teeth, raises the risk of caries in the permanent teeth.[11] This variable could be useful in identifying subjects with a high caries risk. These results should be taken into account when designing preventive programs, so that children likely to develop new caries can be timely identified,

In this study, with elevation of plaque index, the rate of caries in permanent first molar was increased. Vanobbergena et al. found that occlusal and buccal plaque indices were highly significant for having a high caries increment in permanent first molars.[8] Basir et al. believed that high oral hygiene index cannot increase the rate of permanent first molar caries.[12] However, reports suggest that dental plaque is a location for accumulation of cariogenic microorganisms and so we cannot ignore its role in dental caries.[13]

In the present study, there was a significant relationship between consumption of between meal snacks more than three times a day (p=0.046) and caries in permanent first molars. Similar results were found in Beighton et al.[14] and Mariri et al.[15] studies. Mosaaheb et al found that by increase in frequency of snack consumption, the rate of caries elevates.[16] They believed that after using food, especially sugar, saliva PH drops and if food intake is in high frequency and saliva cannot return to normal pH, the likelihood of dental caries increases.

The results of this study showed that using drinks containing sugar before sleep increased the rate of caries in the permanent first molars. This finding supports the results found by Al Ghanim et al. [17] and Matee et al.[18] Continuous contact of teeth with sweet drinks during night can cause saliva PH to reach critical border and caries formation.[19]

Children who started it earlier, had less caries in their first molars. This finding was different from Febres et al.[20] They showed that there was no significant relationship between the age tooth brushing started and dmft. According to Vanobbergen J et al. study, age of start of brushing is highly significant for explaining presence of caries in the primary dentition at age 7, but no longer significant in the permanent dentition.[8]

The results of this study showed that the number of siblings, parent's education, mother's job, frequency and method of tooth brushing cannot increase the rate of caries of permanent first molar.

Similarly Vanobbergen et al.[8] found that none of the socio-demographic and behavioural variables has enough predictive power at community level to be useful for identifying caries susceptible children that support our findings. In this study, family size (number of children) was small (one or two children) and most of mothers were housewives. This can explain our findings.

The association of frequency and time of sugary snacks consumption and first molar caries was not significant.

Due to the importance of permanent first molars, parental education about detection of the eruption time of permanent teeth and caries prevention programs seems to be essential. It is suggested that consumption of snacks during the day be limited .Children and their parents should be aware about oral health and use of supplemental dental health methods.

Conclusion

In conclusion, between meal snacks consumption more than three times a day, using sugary drinks before sleep, high dmft and accumulation of dental plaque elevates the rate of permanent first molar caries.

Socio-demographic parameters and frequency of tooth brushing did not show a significant relation with the permanent first molar caries.

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