

Prevalence of Semi-Erupted First Permanent Molar Occlusal Caries and Evaluation of Related Clinical Factors in Children

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Article information	Abstract
<p>Article history: Received: 21 Jan 2011 Accepted: 8 Mar 2011 Available online: 7 Jan 2012 ZJRMS 2013; 15(1): 52-54</p> <p>Keywords: Semi-erupted molars First permanent molar Occlusal caries Occlusal plaque</p> <p>*Corresponding author at: Department of Endodontics, Faculty of Dentistry, Shahed University, Tehran, Iran. E-mail: Mohammad.Daryaeian@yahoo.com</p>	<p>Background: Occlusal caries in semi-erupted first permanent molars may be the result of special anatomy, long eruption period and incomplete enamel calcification. The aim of this study was to evaluate the relationship between occlusal caries of those teeth and dmft, oral hygiene and plaque on the occlusal surface.</p> <p>Materials and Methods: Total of 193 semi-erupted first permanent molars were evaluated in 85 Zahedanian children concerning the occlusal caries, the amount of plaque on this surface, molar dmft, oral hygiene, dental arch, side and sex.</p> <p>Results: The occlusal surface of 21.8% of the samples was decayed and there was only a significant correlation between the amount of plaque on the occlusal surface and also dmft with occlusal caries ($p=0.03$).</p> <p>Conclusion: Too much plaque on the occlusal surface and dmft are related with occlusal caries.</p> <p>Copyright © 2013 Zahedan University of Medical Sciences. All rights reserved.</p>

Introduction

Susceptibility of the first permanent molar is related to factors such as tooth eruption time and type, special anatomy and incomplete enamel calcification [1, 2]. According to the study of Hata et al. caries in the first permanent molars is often created 1-2 years after eruption [3]. Carvalho et al. found that the plaque on the occlusal surface in fully erupted teeth is significantly less than the semi-erupted teeth [4]. Ekstrand et al. also indicated that the average time of eruption to the complete occlusion of the first permanent molar takes 15 months and such a long time will double the importance of prevention at this age [5]. By considering the above mentioned, the purpose of this study was to investigate the frequency of semi-erupted first permanent molars occlusal caries and evaluation of clinical factors in 6-7 year old Zahedanian children.

Materials and Methods

In this descriptive-analytical study, 193 semi-erupted first permanent molars were investigated. The research was conducted within two sessions meeting with children at school. First session: selecting 6-7 year old children having at least one semi-erupted first permanent molar without permanent or temporary filling, fissure sealant, hypoplastic defects, large cavities (caries) on occlusal or smooth surfaces and fluorosis; Second session:

investigating the desired factors. To obtain a representative sample of 6-7 year old children and also eliminating many confounding factors including social, economic and cultural status, six girls' school and six boys' school were specified from different regions of Zahedan and the qualified children in these schools were selected. In the second session, all children submitted the completed consent form and according to their parents, they had no systemic disease.

In both sessions, the data collection was done by a trained examiner through examination on chair using a mirror, explorer and head light. In this research, semi-erupted state was applied for a tooth which its occlusal surface is completely broken through the gum but it has not yet reached to complete occlusion with the opposite tooth.

Oral hygiene status was evaluated with the Simplified Debris Index (DI-S), so that in the upper arch the facial surface of second primary molars and right primary central incisor and in the lower arch the facial surface of the primary left central incisor and the lingual surface of primary second molars were the selected surfaces to be examined. If any of these teeth was missing, the desired surface would be replaced with permanent central incisor and permanent first molar. Tooth surface was divided into

Third verticals and one of the following codes was given to them based on the existing soft debris using explorer.

0= no debris, 1= soft debris, covering 1/3 or less of the surface, 2= soft debris that cover 1/3 to 2/3 of the surface and 3= soft debris covering 2/3 or more of the tooth surface. Adding up the surface codes and dividing them by the number of the surfaces, DI-S of each individual was obtained and classified into good: 0-0.6, fair: 0.7-1.8, and poor: 1.9-3 [6].

The presence of plaque on the occlusal surface of the semi-erupted first molars was scored by plaque disclosing tablet due to the following criteria: 0=no color change, 1=discoloration limited to pits and grooves, 2=full or partial discoloration [4]. The examiner recorded the molars dmft and Semi-erupted first permanent molar occlusal caries based on WHO standards [7]. Statistical analysis was performed using χ^2 test and with a significance level of 0.05.

Results

All of 193 semi-erupted first permanent molars were investigated in 85 children aged 6-7 years old with average age 76 ± 3 months, including 43 girls (50.6%) and 42 boys (49.4%). In the clinical examination, the occlusal surface of 151 teeth (78.2%) was intact and 42 teeth (21.8%) had caries. Concerning the amount of plaque on the occlusal surface, 3.6% of the samples had no plaque; 77.7% had plaque as grooves and 18.7% had partial or full covering of plaque. Based on χ^2 test, a significant relationship was obtained between the amount of plaque on the occlusal surface and caries frequency in this surface ($p=0.03$).

Also, there was no significant relationship between the dental arch and side with occlusal caries; although more caries was observed on the occlusal surface of the lower teeth. 10.3% of the samples had good oral hygiene; 72% and 17.7% had, respectively, fair and poor oral hygiene. Occlusal caries was found in 20% of the samples with good oral hygiene, 22.3% with fair oral hygiene and 20.6% of the samples with poor oral hygiene. According to the statistical test, there was no significant relationship between the frequency of occlusal caries and oral hygiene level ($p=0.14$). 18 teeth (19.6%) in males and 24 teeth (23.8%) in females had caries on the occlusal surface; so, there was not a significant difference between males and females ($p=0.6$).

27 (14%) of all the teeth was found in children with dmft less than 3 and the rest was observed in children who had dmft equal or larger than 3.

Table 1 also indicates that there is a significant relationship between occlusal caries in the samples and dmft ($p=0.03$). This means that as dmft increase, the amount of occlusal caries will also increase.

Table 1. Frequency distribution of caries in the studied samples based on dmft

	Occlusal surface	Intact N(%)	Cariou N(%)
dmft			
< 3		26 (96.3%)	1 (3.7%)
≥ 3		125 (75.3%)	41 (24.7%)
Total		151 (78.2%)	42 (21.8%)

Discussion

The findings of the study indicated that 21.8% of the samples had occlusal caries. In this research, the prevalence of occlusal caries in the studied teeth in girls was more than boys, although they were not significantly different. The study of Li and Wang and Azizi confirm the findings in this respect [8, 9]. But the study of Hata et al. indicated that the prevalence of caries in girls was significantly higher [3].

Considering dental arch and side, the research indicated that the lower teeth are more subjected to occlusal caries than the upper teeth. Although regarding the prevalence of caries, the difference between dental arch and side was not significantly different. The results are similar to the studies done by other populations [3, 10]. The reason may be the susceptibility of mandibular teeth to caries due to more occlusal grooves and contribution to the gathering of food stuffs and plaques on the occlusal surface.

Also, the relationship between the prevalence of occlusal caries and oral hygiene was not statistically significant. In respect of the relationship between oral hygiene and caries, the present study is consistent with the study of Quagilo et al. who concluded that there is no significant relationship between the plaque index and first permanent molar caries [11]. But in the view of Leroy et al., the effect of oral hygiene on first permanent molar caries is noticeable [12]. It seems that occlusal caries has no relationship with oral hygiene. In our study, occlusal caries was affected by the amount of plaque on this surface. This means that as the plaque increases, the prevalence of caries will go up and there was a significant relationship between them. The finding is similar to the study of Quagilo et al.

The researcher concluded that too much plaque on the occlusal surface and first permanent molars with active caries are interconnected [11]. As the evolution of caries lesion is exactly next to the bacterial plaque, the relationship between occlusal caries and the plaques existing on the surface in comparison with the relationship between caries and oral hygiene seems logical.

Gray et al. found a close relationship between caries in primary and permanent teeth [13]. Vallejos- Sanchez et al. also came to a result similar to our study, so that they found a significant relationship between caries in primary and permanent teeth [14]. Li and Wang concluded that primary teeth caries is a sign of caries risk in permanent teeth [8]. Skeie et al. found that there is a significant correlation between second primary molar caries at the age of 5 and permanent molars of the same person at the age of 10 [15]. All the aforesaid studies emphasize the relationship between caries in primary and permanent teeth. The results of our study also indicate that there is a significant relationship between dmft and semi-erupted first permanent molar occlusal caries. In the present study, a relatively high percentage of semi-erupted first permanent molars had occlusal caries which statistically had a significant relationship with the amount of the existing plaques on the occlusal surface as well as dmft.

The findings of the study put emphasis on taking preventive measures to avoid caries in semi-erupted first permanent molars such as exact plaque removal on the occlusal surface before complete eruption and taking care of the primary teeth. Likewise, the results of the research reveal the necessity of authorities' attention to training needs for improving the parents' knowledge, attitude and practice in this field. In this research, the semi-erupted first permanent molars with extensive caries on the occlusal or smooth surface were omitted. The reason for the omission of these samples may be expressed in this way: these teeth probably have had defects from the beginning due to systemic or hereditary reasons including enamel hypoplasia or amelogenesis imperfecta and for this reason they have been afflicted with extensive destruction which cannot be distinguished from the caries resulting merely from environmental reason. Of course, in this manner it is probable that less frequency of occlusal

caries be obtained in the studied samples in relation to what really exists.

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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