

CARIES PATTERN OF HIGH CARIES PRE-SCHOOL CHILDREN ATTENDING A DENTAL CLINIC IN RIYADH, SAUDI ARABIA

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الغاية من هذه الدراسة هو تحديد نموذج النخر في الأسنان المؤقتة والمأخوذة من أطفال قبل دخولهم المدارس والمصابين بالنخر .
في الرياض بالمملكة العربية السعودية ، ستة وأربعون طفلاً ، بعمر ستة سنوات وما دون ، وبمؤشر نخر (- + ٨) مأخوذ من السجلات السنوية في عيادات كلية طب الأسنان - جامعة الملك سعود .
وتم تسجيل إمكانية حدوث النخر بناء على معلومات أخذت من الفحص الإكلينيكي والصور الشعاعية الإطباقية وتتألف العينات من (٢٦) مريض و (٢٠) مريضة تتراوح أعمارهم بين أربعة وستة سنوات ومعدل العمر كان ٤.٨ سنة ومعدل حدوث النخر ١٢ (- + ٢.٨) . تسعة من عشرة أطفال كان لديهم نخر في الثنية العلوية وكذلك في الأسنان الخلفية . وكان أكثر الأسنان عرضة للنخر في الأرحاء الأولى والثانية . وكان النخر في كلا الطرفين الأيمن والأيسر وفي نفس الأسنان وفي نفس السطوح الملاصقة .
أظهرت صور الأشعة الإطباقية أن حدوث النخر على السطوح الوحشية للأرحاء الأولى السفلية كان أكبر من حدوثه على السطوح الإبتسية لهذه الأرحاء . وأظهرت السيرة المرضية للأرحاء الثانية السفلية سيرة مشابهة لما يحدث في الأرحاء الأولى . أظهرت هذه النتائج أن نموذج النخر الحادث بين هذه العينات المختارة من الأطفال قبل دخولهم المدارس في منطقة الرياض بالسعودية كان النخر فيهم شائعاً في منطقة الثنايا العلوية مع نخر في الأسنان الخلفية وكذلك أظهرت الصور الشعاعية الإطباقية نخر خلفي ملاصق في منطقة نقاط التماس .

The objective of this retrospective study was to determine caries pattern in the primary teeth of a select sample of high caries pre-school children in Riyadh, Saudi Arabia. Forty-six children, six years of age and under, and with dmft $>$ 8, were selected from the dental records of the undergraduate clinics at King Saud University, College of Dentistry. Caries prevalence was recorded based on clinical and radiographic (bitewing) data. Frequency distribution, chi-square test and odds ratio computations were made. The sample consisted of 26 males and 20 females ranging in age from four to six years. Mean age of the sample was 4.8 years (S.D. + 0.7 years) and mean dmft was 12.0 (S.D. + 2.8). Nine out of ten children had both maxillary incisor caries as well as posterior tooth caries. First and second molars were the teeth most susceptible to caries. Caries prevalence was bilateral ($p < 0.0001$), being both tooth-specific as well as posterior interproximal surface-specific. Bitewing radiographs showed highest caries prevalence on the distal surface and lowest prevalence on the mesial surface of mandibular first molars. Contiguous surfaces of first and second molars showed similar caries experience ($p < 0.0001$) on bitewing radiographs. These results demonstrated that the caries pattern in this select sample of high caries pre-school children in Riyadh, Saudi Arabia was predominantly of maxillary incisor caries type with posterior decay. Bitewing radiographs demonstrated posterior interproximal decay in these children reflecting the pattern of development of proximal contacts and physiologic (primate) spacing.

Introduction

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Dental caries in primary teeth have
been declining over the years in the

developed countries.' Nevertheless, caries experience in pre-school children showed a steep increase with age affecting 28.0 - 36.6 percent of the children by three years of age.^{3,4} Johnsen et al. reported that for low socio-economic Head Start children in the United States (three and a half to five years of age), caries experience ranged from 50 percent of those residing in optimally fluoridated non-urban areas to 64 percent in non-fluoridated urban areas. Therefore, despite the declining trend in dental caries, there appears to be a resistant group of children who continue to manifest high levels of caries in the primary teeth. It has been reported that the caries distribution in pre-school children is skewed with most of the decay being experienced by a minority of the children. Further, it has been observed that pre-school children with high levels of caries in the primary teeth at 5 years of age showed the highest level of caries attack in permanent teeth at 9 years of age.

Knowledge of caries pattern in pre-school children with high levels of caries is therefore necessary to better understand the disease manifestation and formulation of appropriate treatment strategies for these children. For example, Johnsen et al. noted that children with nursing caries were more susceptible to lesions of approximal surfaces of primary molars than were children initially caries-free. Thus, a dentist would anticipate posterior interproximal lesions in these children and monitor them with adequate bitewing radiographs to detect interproximal caries. Further, information on caries pattern in high caries pre-school children could be used as a part of anticipatory guidance for these children. Accordingly, the objective of this retrospective study was to determine caries pattern in the primary teeth of a selected sample of high caries pre-school children in Riyadh, Saudi Arabia.

Materials and Methods

The dental records of children, six years of age and under, who were treated at King Saud University, College of Dentistry (Darriyah University Campus) in Riyadh, Saudi Arabia, were reviewed for the period 1986 - 1993 for this convenience sample selection study. Saudi children presenting for initial examination in the undergraduate clinics were included if the dental charting had been approved by a member of the pediatric dentistry faculty to ensure accuracy of the charting. Children without bitewing radiographs were also excluded. Radiographic appearance of caries was scored by two pediatric dentists based on mutual agreement. Caries level (dmft) was recorded based on clinical and radiographic data.

High caries pre-school children were selected with dmft $> .8$ based on mean dmft of 3.83 plus one pooled standard deviation (3.57) reported for Saudi children at six years of age.' Missing teeth were considered to have been extracted because of caries. This assumption is likely to have caused overestimation of caries experience in the incisors, some of which, might have been missing due to trauma. Children with missing incisors were included provided they are five years of age and under. This was done to rule out incisors lost due to normal exfoliation. Restorations and recurrent caries were included in caries prevalence. Gross caries involving the occlusal and proximal surfaces were not scored positive in bitewing radiographic examination. This distinction was made to differentiate between the occlusal and interproximal caries pattern. Maxillary incisor caries was defined as caries in one or more maxillary incisor teeth.

Data analyses included frequency distribution, chi-square test and odds ratio computations. Statistical significance was set at $p = 0.05$.

Results

The sample consisted of 46 high caries pre-school children (26 males and 20 females) ranging in age from four to six years. Mean age of the sample was 4.8 ± 0.7 (S.D.) years with mean dmft of 12.0 ± 2.8 (S.D.). All of the children (100%) had posterior tooth caries. Nine out of ten children (89.1%) had both maxillary incisor caries as well as posterior tooth caries. First

prevalence on the mesial surface (15.2%) of mandibular first molars (Table 2).

Caries prevalence was bilateral ($p < 0.0001$) based on both clinical (tooth-specific) as well as bitewing radiographic (posterior interproximal surface-specific) data. The odds ratio of having caries on a left tooth was 58.64 (95% CI: 32.79; 104.77) given the presence of caries on the right antimere tooth. Similarly, the presence of caries on a right posterior interproximal surface indicated caries prevalence on the left

Table 1. Tooth-specific caries prevalence.

Tooth	Maxillary		Mandibular		Total (n = 184)
	Right (n = 46)	Left (n = 46)	Right (n = 46)	Left (n = 46)	
Central Incisor	78.3%	76.1%	15.2%	19.6%	47.3%
Lateral Incisor	52.2%	60.9%	10.9%	6.5%	32.6%
Canine	34.8%	34.8%	21.7%	21.7%	28.3%
First Molar	93.5%	95.7%	100%	97.8%	96.7%
Second Molar	95.7%	95.7%	95.7%	97.8%	96.2%

and second molars were the teeth most susceptible to the disease (Table 1).

Almost all the children (93.5%) showed posterior interproximal caries on bitewing radiographs with many of these children (82.6%) also having maxillary incisor caries. Bitewing radiographs showed mean dmfts of 6.3 ± 2.9 (S.D.) with the highest caries prevalence on the distal surface (83.7%) and lowest

contralateral surface with an odds ratio of 12.96 (95% CI: 7.31; 23.00). Contiguous surfaces of first and second molars showed similar caries experience ($p < 0.0001$) on bitewing radiographs. Presence of caries on the distal surface of the first molar denoted caries prevalence on the adjacent mesial surface of the second molar with an odds ratio of 19.24 (95% CI: 8.27;44.77).

Table 2. Posterior Interproximal surface-specific caries prevalence.

Tooth Surface	Maxillary		Mandibular		Total (n = 184)
	Right (n = 46)	Left (n = 46)	Right (n = 46)	Left (n = 46)	
First Molar (Mesial)	17.4%	26.1%	17.4%	13.0%	18.5%
First Molar (Distal)	67.4%	60.9%	82.6%	84.8%	73.9%
Second Molar (Mesial)	63.0%	60.9%	71.7%	65.2%	65.2%

Discussion

This retrospective study examined caries pattern in a select sample of high caries pre-school children obtained from the Dental clinics at the College of Dentistry, King Saud University, Riyadh, Saudi Arabia. Caries prevalence by tooth type in decreasing order in the present study was: first and second molars, central incisor, lateral incisor and canine. This ordering of caries prevalence by tooth type is similar to that reported for pre-school children in the United States. Second molar susceptibility in the present study confirms earlier reports on pre-school children in the United States, Hong Kong, and the United Kingdom.

Mandibular first molars were the teeth with the highest caries prevalence in the present study and is similar to the observation on Tanzanian pre-school children. However, this contradicts observations made on pre-school children in Hungary, United States, Finland, and Japan where the highest caries prevalence was found in the mandibular second molar. Further, the above observations are contrary to a report on Tanzanian pre-school children where the maxillary central incisors were the most affected teeth.

Most children in the present study had maxillary incisor caries in accordance with Wei et al.'s observation that one-third of all decayed surfaces in Hong Kong's 5 year old children were found in maxillary incisors. Since all the children in the present study also had posterior tooth caries, this finding is similar to the observation reported in U.S. pre-school children where most of the children with maxillary anterior caries also had posterior tooth caries.²⁰ Nearly all the children in the present study manifested posterior interproximal caries as seen on bitewing radiographs with many of them also having maxillary incisor caries. This is in accordance with the reports from

the United States that pre-school children with maxillary anterior caries are at markedly greater risk for developing the posterior proximal caries pattern by five year of age.^{21,22}

Caries prevalence was bilateral in the present study similar to earlier reports on pre-school children in Australia and Hong Kong.⁸ Further, posterior interproximal contralateral surfaces in the present study showed similar caries prevalence on bitewing radiographs confirming the phenomenon noted in pre-school children in Australia where caries was bilateral whether expressed by tooth or tooth surfaces.

Bitewing radiographs in the present study showed that posterior interproximal caries was the highest on the distal surface of the mandibular first molars. This confirms the observations made on pre-school children in the United States and China. It has been suggested that this finding can be partially attributed to the anatomical contour of the interproximal area between the mandibular first and second molars.

Contiguous surfaces of the first and second molars on bitewing radiographs showed similar caries experience in the present study. This is in agreement with the observations made on 6-9 year old children in England. Further, caries prevalence in the present study was greater on the distal surface of the first molar than the mesial surface of the second molar. This is in accordance with the finding made by Parfitt on English children. He noted that an accumulation of cavities before the eruption of the second molar was the likely explanation for the greater number of cavities seen on the distal surface of the first molars.

It has been reported that caries on the interproximal surfaces was greatest when the teeth were in contact and becomes progressively less with spacing between the

teeth.²⁵ Using the criterion of 0.5 mm spacing or more between the teeth, caries was ten times more common when the teeth were not spaced in 4 year old children in England. In the present study, lowest caries prevalence on bitewing radiographs was seen on the mesial surface of mandibular first molars. This finding is partially explained by the observation of Baume who noted the presence of a distinct diastema (spacing) between the mandibular canine and first molar and referred to it as a "primate space." Therefore, the pattern of posterior interproximal caries in pre-school children as seen on bitewing radiographs in the present study reflected the pattern of development of proximal contacts and physiologic (primate) spacing.

Conclusion

Caries pattern in this select sample of high caries pre-school children in Riyadh, Saudi Arabia, was predominantly of maxillary incisor caries type with posterior decay. Bitewing radiographs demonstrated posterior interproximal decay in these children that reflected the pattern of development of proximal contacts and physiologic (primate) spacing. Caries prevalence was bilateral being both tooth-specific as well as posterior interproximal surface-specific. Caries prevalence on the distal surface of first molars was associated with a greater likelihood of caries on the adjoining mesial surface of the second molars.

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