Prevalence of pre-eruptive intracoronal dentin defects from panoramic radiographs

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Abstract

Purpose: This investigation stemmed from preliminary clinical observations from a school dental clinic, which suggested that a proportion of clinically undetected, radiolucent lesions on radiographs may originate as pre-eruptive intracoronal dentin defects. This study investigated the prevalence of such defects in orthopantomograms from a group of children and young adults.

Methods: A total of 1281 orthopantomograms with 11,767 unerupted permanent teeth were examined.

Results: The prevalence of intracoronal dentin defects was 3% by subjects, and 0.5% by teeth; the highest prevalence being noted in the maxillary and mandibular first permanent molars. Most of the lesions occurred singly, and nearly half had extended to greater than two-thirds the width of dentin thickness. Ectopic positioning was significantly associated with this lesion.

Conclusions: Pre-eruptive intracoronal dentin defects occur at a significant prevalence rate. Increased awareness of this entity may improve diagnosis and allow early treatment. (Pediatr Dent 21:332-339, 1999)

Intracoronal pre-eruptive dentin radiolucencies are characteristically noted as incidental findings on radiographs of unerupted teeth, where they often appear as well-defined radiolucencies within the coronal dentin, immediate to the amelodentinal junction.[1-5] These lesions often resemble dental decay, and the term "pre-eruptive caries" had been occasionally applied.[6-12] As there is little histopathological and microbiological evidence to support the hypothesis that these lesions are carious in nature while unerupted, the term "pre-eruptive dentin defect" is now preferred.[2]

Clinical and histological evidence from several case reports have suggested that these lesions are likely to be resorptive in nature.[1-3,13,18] Although the etiology and factors associated with the initiation of resorption remain unknown, resorptive cells originating from the surrounding bone are thought to enter the dentin through a break in the dental follicle and enamel or cementum.[1,14] Although the clinical significance of pre-eruptive dentin defects is still unclear, we hypothesized that they may constitute a proportion of radiolucent lesions often diagnosed as caries in radiographs of clinically sound, erupted permanent teeth.

Preliminary clinical observations

In preliminary observations, we found that of 2926 children examined in one year at a school dental clinic, 66 (2%) showed (on bitewings radiographs), to have radiolucencies resembling caries in the dentin of teeth which have been considered caries-free during clinical inspection using dental explorers. Of these 66 children with clinically undetected lesions, 31 (47%) had previous bitewing radiographs which showed the affected teeth in pre-eruptive stages. In every one of these 31 children, when these radiographs were examined, we found dentin radiolucencies in the affected teeth even prior to eruption. This suggests that some lesions of undetected caries may have their origins as pre-eruptive defects. The findings are documented in Table 1.

Thus, the preliminary observations support our novel hypothesis that dentin defects originating during the pre-eruptive stages may constitute a significant proportion of clinically undetected radiolucent lesions. Furthermore, in a previous study[3] in which unerupted teeth from bitewing radiographs were examined, we found a subject prevalence of six percent, and a tooth prevalence of two percent. As the ability to detect pre-eruptive radiolucent defects may vary with the type of radiograph, we therefore aimed to study the prevalence of these defects from panorex radiographs.

Materials and Methods

As it was important to distinguish the lesions of pre-eruptive dentin defects from routine caries lesions which occur post-eruptively, only unerupted teeth which have not emerged into the oral cavity were assessed. In this study, the orthopantomogram was employed as it is commonly exposed in clinical practice, and shows the maximum number of unerupted teeth in a single radiograph. For calibration purposes, all three investigators were trained in the diagnosis of pre-eruptive intracoronal dentin defects using panorex radiographs which were not part of the study. Inter-examiner variability tests performed in previous studies[3] showed no significant inter-examiner differences in the diagnosis of these defects ($P>0.1$).

Orthopantomograms employed for the study were obtained from the patient records kept at a School Dental Clinic in Brisbane and the School of Dentistry, University of Queensland. All orthopantograms of subjects aged 25 years and younger at the two centers were examined. In the group of children below six years of age, the radiographs were exposed to screen for absence of permanent teeth or other pathology. In those between 7-14 years of age the radiographs were usu-

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Table 1. Cases Showing Pre-eruptive Dentin Defects in Preliminary Observations

Case No.	Sex	Age at radiographic exposure (yrs)	Fluoride history Yes/No (yrs of intake)		Pre-eruptive dentin defect Affected tooth (location of defect, size of defect : I=<1/3 relative dentin thickness, II=1/3 relative dentin thickness, III=>1/3 relative dentin thickness)	
			Fluoride in drinking water	Oral fluoride suppplements	Maxillary	Mandibular
1.	M	5.2	No	No		19 (mesial, size II) 30 (central, size I)
2.	M	5.2	No	No		19 (central, size II)
3.	F	5.4	No	No	3 (mesial, size I) 14 (mesial, size I)	19 (mesial, size I)
4.	F	5.2	No	No		19 (mesial, size I)
5.	F	6.1	No	No		30 (mesial, size I)
6.	M	5.4	No	No	14 (mesial, size I)	30 (central, size I)
7.	F	8.3	No	No		20 (mesial, size I)
8.	M	5.1	No	No		36 (central, size I) 46 (mesial, size I)
9.	F	6.2	No	No		19 (mesial, size 1) 30 (mesial, size 1)
10.	F	12.2	No	No	6 (distal, size II)	31 (mesial, size 1)
11.	M	5.1	No	No		19 (central, size III)
12.	M	10.1	No	No		18 (central, size II)
13.	M	11.7	No	No		18 (mesial, size I) 31 (central, size II)
14.	M	8.3	No	No		21 (mesial, size I)
15.	F	8.1	No	No		29 (distal, size I)
16.	F	11.2	No	Yes (2 yrs)	6 (distal, size I)	
17.	F	5.3	No	No	3 (mesial, size II)	
18.	M	5.9	No	No	14 (mesial, size I)	
19.	F	5.1	No	Yes (0.5 yr)		30 (central, size III)
20.	F	5.8 8.4	No	No		19 (central, size I) 29 (mesial size I)
21.	M	5.3	No	No	14 (central, size I)	
22.	F	5.8 11.6	No	No		19 (central, size I) 18 (mesial, size I)
23.	F	5.4	Yes (3 yrs)	No		19 (central, size I)
24.	F	10.3	No	No		31 (central, size 1)
25.	F	6.1	No	No	3 (mesial, size I) 14 (mesial, size I)	
26.	F	5.9	No	No		19 (central, size 1) 30 (central, size 1)
27.	M	11.3	No	No		31 (central, size I)
28.	M	5.2 12.6	No	No	3 (mesial, size I)	 18 (central, size II)
29.	F	5.9	No	No	14 (mesial, size III)	
30.	F	5.4	No	No		30 (mesial, size I)
31.	F	12.0	No	No		20 (central, size II)

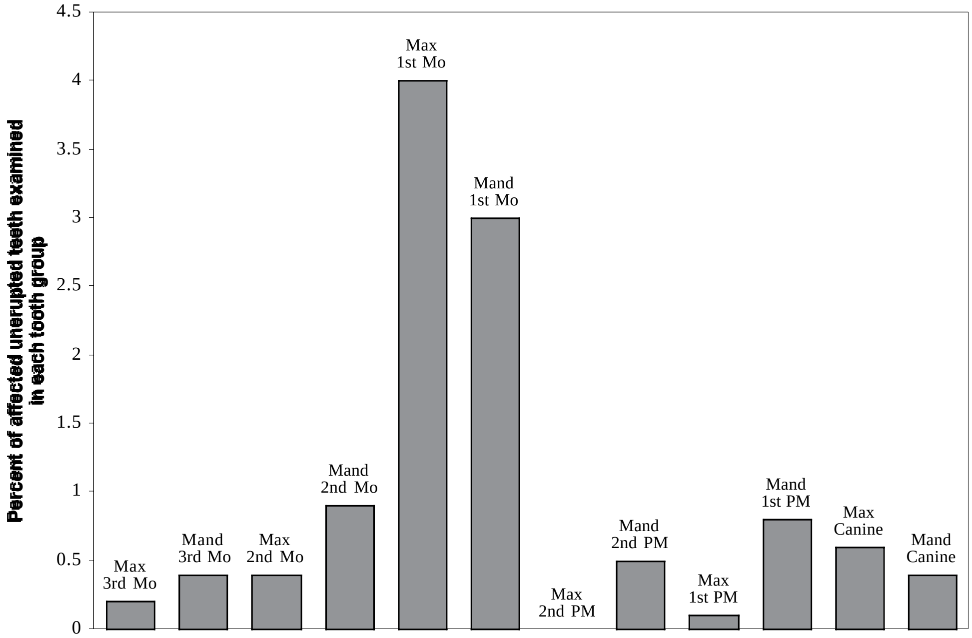

Fig 1. Prevalence of pre-eruptive dentin defect in the various tooth groups.

ally taken for orthodontic diagnosis, and in those greater than 15 years of age, they were mainly exposed to determine the presence of third molars.

Patients with documented medical and dental pathology such as amelogenesis imperfecta, dentinogenesis imperfecta, and hypophoshatemic rickets were eliminated from the study. Radiographs which were not of optimal diagnostic quality were also excluded. Furthermore, radiolucencies on mandibular molars that showed a linear appearance resembling buccal grooves were not diagnosed as having pre-eruptive dentin defects.

The radiographs were examined by one of the investigators whose Kappa value for intra-examiner agreement was 0.9. Radiographs showing pre-eruptive dentin defects were verified by the two other investigators.

An unerupted tooth was defined as one that was covered by bone and/or mucosa and below the occlusal plane. All unerupted teeth in each radiograph were examined and totaled. Each unerupted tooth was examined with regard to the absence or presence of radiolucencies within the dentin of the crown. The location of each radiolucent defect was noted with regard to whether it was on the central, mesial, or distal aspect of the occlusal. The size of each defect relative to coronal dentin thickness was also noted as to whether it was within one-third dentin thickness, or two-thirds dentin thickness, or extended through the full dentin thickness of the crown.

In addition, the position of each unerupted tooth was assessed. A tooth was considered ectopically positioned if its long axis or crown position was considered deviated from the normal on the radiograph. A 'mesial' or 'distal' ectopic position described a tooth whose long axis was deviated mesially or distally, respectively. As the radiographs were not exposed using standardized techniques, the assessment of ectopic position was performed using the clinical judgement of two pediatric dentists.

Statistical analysis

Chi-square tests were used to determine statistical differences between the groups. The χ value was set at 0.05.

Results

Demography of subjects

As shown in Table 2, 1281 orthopantomograms (671 from females, 610 from males) were employed for the study. Thirty-seven subjects had radiographs showing unerupted first molars, and their mean age was 5.1 yrs ± 1.3 yrs (range 3.5 to 6.1 yrs), whereas there were 560 children with radiographs of unerupted second molars and premolars and these had a mean age of 9.7 yrs ± 3.9 yrs (range 6.5 to 11.1 yrs). There were 684 subjects with radiographs showing unerupted third molars, and these had a mean age of 17.3 yrs ± 5.3 yrs (range 15.5 to 25.0 yrs).

A total of 11,767 unerupted teeth were examined. The incisor teeth were excluded from examination due to the lack of definition of these teeth in the anterior regions of the orthopantomograms.

Prevalence of pre-eruptive dentin defects

As shown in Table 2, there were 42 subjects who showed at least one tooth with a pre-eruptive dentin defect, thus giving a subject prevalence of 3%. On the other hand, as there were 57 teeth showing the defect, the overall prevalence by teeth was 0.5% (Table 2).

The prevalence in each tooth type was assessed by dividing the number of affected teeth by the total number of unerupted teeth examined in each tooth type. The results are shown in Figure 1. The highest prevalence of pre-eruptive intracoronal dentin defects was seen in the maxillary first molar (3 out of 75 [4%]), followed by the mandibular first molar (2 out of 66 [3%]), mandibular second molar (11 out of 1167 [0.9%]),

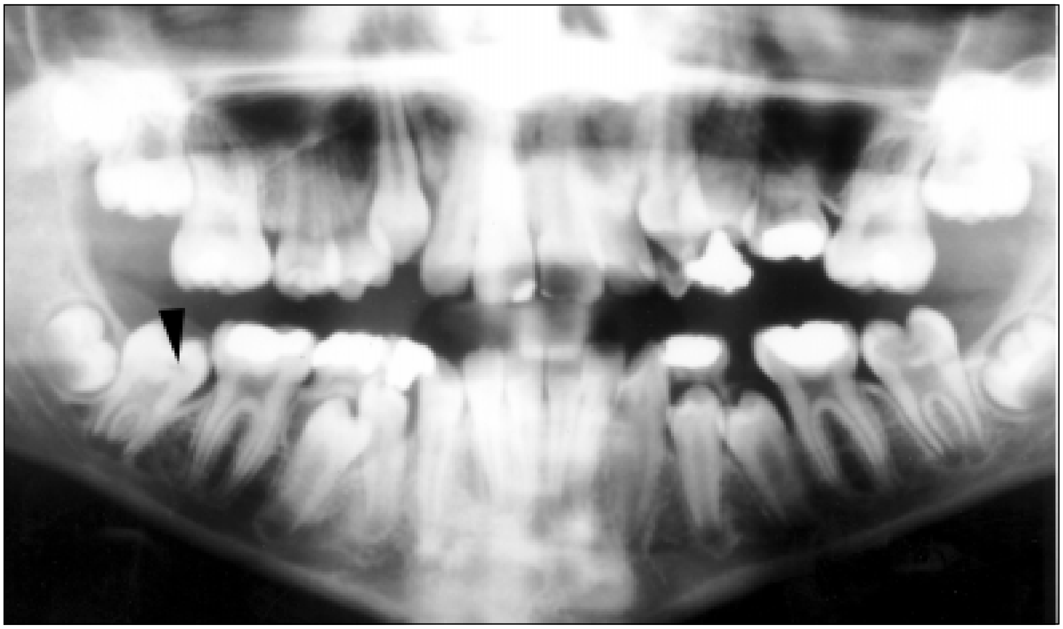

Fig 2. Orthopantomogram showing the presence of a pre-eruptive dentin defect (arrow head) in the mandibular right second molar.

mandibular first premolar (8 out of 923 [0.8%]), maxillary canine (8 out of 1191 [0.6%]), mandibular second premolar (6 out of 1151 [0.5%]), maxillary second molar (5 out of 1279 [0.4%]), mandibular canine (4 out of 858 [0.4%]), mandibular third molar (5 out of 1377 [0.4%]), maxillary third molar (4 out of 1599 [0.2%]), and maxillary first premolar (1 out of 912 [0.1%]). There was no maxillary second premolar tooth affected.

Figures 2 and 3 show the typical appearances of pre-eruptive dentin defects on the orthopantomograms. Figure 2 shows a mandibular right second molar tooth that was in a mildly ectopic position. The mandibular second molar on the opposite side also showed a large radiolucency in the coronal dentin. Although it is likely that the radiolucency in this tooth may have started previously as a pre-eruptive dentin defect, this lesion was not included in the study because the tooth appeared fully erupted on the radiograph.

In 14 subjects (24%), at least one other radiograph exposed at a different time, further confirmed the presence of pre-eruptive dentin defects diagnosed on the first radiograph.

Location of pre-eruptive dentin defects (Table 3)

As the location of the defects may have significance in relation to diagnosis of defects, these were noted. All the radiolucent defects were found beneath the occlusal aspect directly adjacent to the amelodentinal junction. As shown in Table 3, all the defects were single lesions, and were located in the central aspects of the crown (49%), followed by mesial (35%), and distal aspects (16%). The differences in prevalence of locations of the defects were statistically significant (P<0.02).

Size of pre-eruptive dentin defects

All the defects within the crown were noted adjacent to the amelodentinal junction, and extended from this area to various depths within the dentin. The size of a defect is significant in that an untreated lesion is usually progressive, and its proximity to the pulp determines clinical treatment and prognosis. When the size of defects were classed relative to the depth of coronal dentin, it was noted that 23 (40%) had extended to greater than two-third of the thickness of coronal dentin, 16 (28%) were between one-third and two-thirds relative dentin

Table 2. Demography and Prevalence of Pre-eruptive Dentin Defect

	Pre-eruptive dentin defect		
	Defects absent	Defects present	Total
Subjects examined	1239	42	1281
Prevalence of defects by subjects	97%	3%	
Gender			
Female	758 (96%)	20 (4%)	778 (100%)
Male	683 (97%)	22 (3%)	705 (100%)
Unerupted teeth examined	11, 767	57	11, 710
Prevalence of defects by teeth			0.5%
Defects in teeth confirmed by another set of radiographs			14 (24%)

Fig 3. Orthopantomogram showing a maxillary right second molar which has a pre-eruptive dentin defect. The ectopically-positioned tooth appeared to be impacted against the maxillary first permanent molar.

thickness, and 18 (32%) were less than one-third relative dentin thickness. These differences in prevalence were not significant (*P*>0.1).

Prevalence of ectopically positioned teeth in groups with and without pre-eruptive dentin defects

To determine the association of ectopic positioning of unerupted teeth with location of pre-eruptive dentin defects, the numbers and direction of deviations of ectopically positioned teeth were noted in the group with pre-eruptive dentin defects as well as in the group without the defects.

The results showed that overall, there were 36 (6%) ectopically positioned teeth out of a total of 570 unerupted teeth in the group of subjects showing pre-eruptive dentin defects, compared to 280 (2%) out of a total of 11,767 unerupted teeth in the group without the defects. These differences were statistically significant (*P*<0.001).

When individual groups of teeth were analyzed, the canines, premolars, and third molars all showed significantly higher prevalences of ectopically-positioned teeth in the group of subjects with pre-eruptive dentin defect, compared to the group without the defect. The prevalence of ectopically positioned teeth in those with pre-eruptive dentin defects and those without defects was in the canines 10% vs 6% (*P*<0.05), in the premolars 6% vs 0.8% (*P*<0.001), and in the third molars 15% vs 4% (*P*<0.001).

Direction of deviation of ectopically positioned teeth in relation to location of pre-eruptive dentin defect

All ectopically positioned teeth, which were associated with pre-eruptive dentin defects were listed in relation to their position deviations, as well as to the associated pre-eruptive dentin defect. In the group with pre-eruptive dentin defects, 12 out of 36 (33%) ectopically positioned teeth showed pre-eruptive dentin defects within the crowns themselves, and four (11%) showed the defects on an adjacent tooth, while 20 (56%) were not associated with dentin defects.

With regard to the canines, in the group of subjects with pre-eruptive dentin defects, 7 out of 12 ectopic canine teeth (58%) showed pre-eruptive radiolucent defects within their crowns. One ectopic canine (8%) was associated with a pre-eruptive dentin defect in an adjacent lateral incisor, and the remaining 4 (34%) ectopic canines did not have pre-eruptive dentin defects (Table 4).

Regarding the premolars, in the subjects with pre-eruptive dentin defects, there was only one out of 15 (7%) ectopic teeth which showed a pre-eruptive dentin defect within its crown. The majority of ectopic premolars were not associated directly with pre-eruptive dentin defects.

In the case of molars, of the nine ectopic teeth present in the group with pre-eruptive intracoronal dentin defects, two (22%) were found at sites distant to the defects, whereas four (44%) showed defects within its own crown, and in three (33%), the defect was found in an adjacent tooth.

Discussion

There is increasing recognition that clinically intact occlusal surfaces, or surfaces well sealed with fissure sealants may show radiolucencies in the coronal dentin, suggestive of caries, on radiographs. The prevalence of such "occult" or hidden caries has been shown in several recent studies to range from 1.4% in maxillary molars, and 7.2% of mandibular molars in patients between 14-15 years of age[19] to over 50% of molars in 20 year-olds.[20]

Although the etiology of clinically undetectable caries is still unclear, we hypothesized that some of these lesions may have their origins as pre-eruptive dentin defects. In our clinical observations, we found that of 66 patients with clinically undetected occlusal caries, 31 showed pre-eruptive dentin radiolucencies in previous radiographs which were exposed while these teeth were still unerupted. Although this observation supports our novel concept that many clinically undetected lesions had originated as pre-eruptive dentin defects, the actual percentage contribution of these lesions to the overall

Table 3. Location of Pre-eruptive Dentin Defect

	Location of defect in tooth crown			
	Mesial	Central	Distal	Total
1st Molar				
Maxillary	1	2		
Mandibular		9		12
2nd Molar				
Maxillary	1	1	3	
Mandibular		3	1	9
3rd Molar				
Maxillary	1	2	1	
Mandibular	2	2	1	9
1st Premolar				
Maxillary	1			
Mandibular	6	2		9
2nd Premolar				
Maxillary				
Mandibular	2	4		6
Canine				
Maxillary	4	3	1	
Mandibular	2		2	12
*Total (%)	20 (35%)	28 (49%)	9(16%)	57(100%)

*The differences in the prevalences of location of defects were statistically significant, $P<0.02$, $x^2=8.43$, df=2

prevalence of hidden caries is unknown as not every one of the subjects have radiographs of the affected teeth during the pre-eruptive stages.

The present study, using panoramic radiographs routinely taken for orthodontic diagnosis, found that three percent of subjects showed pre-eruptive dentin defects. Of the 11,767 unerupted teeth examined, 57 were found to be affected, giving a tooth prevalence of 0.5%. The present prevalence from panorex radiographs is thus lower than the two percent tooth prevalence and six percent subject prevalence found from our previous study using bitewing radiographs.[3] The reason for the difference in prevalence is likely to be due to differences in definition of the various unerupted tooth groups in the two types of radiographs. The maxillary molar and premolar crowns of unerupted teeth are usually not as well defined in the panorex radiographs compared to the mandibular teeth, and defects in these teeth may have been missed. Hence, the true relative prevalences of these pre-eruptive defects are probably difficult to ascertain due to the fact that not all unerupted teeth can be properly assessed from any one type of radiograph in any individual patient.

The majority of previous studies[1-3,13-17] have supported the hypothesis that pre-eruptive dentin lesions are resorptive in nature. In these lesions, there is usually evidence of resorption such as the presence of multinucleate cells, osteoclasts, and other chronic inflammatory cells in the lesion, as well as scalloping of the periphery of the lesion on histological examination.[1,14,18,21] The resorptive cells most probably originate from the surrounding bone, and are likely to have entered the developing tooth through breaks through the dental follicle and enamel.[1] Apart from extremely advanced defects, the majority may be clearly distinguished from internal pulpal resorption by their locations, which are usually adjacent to the amelodentinal junction beneath the occlusal surfaces of the crowns of unerupted teeth. There is usually no communication with the dental pulp. While the tooth is unerupted, the resorption process within the lesion may be progressive.[1,4] Upon eruption of the tooth into the oral cavity and entry of microorganisms into the defects, decay usually becomes superimposed on the resorbed defect, so that the lesions become clinically indistinguishable from routine caries.[3] However, as the majority of lesions are covered by relatively intact enamel, they are usually not clinically detected until radiographs are exposed.

Our preliminary observations did not reveal systemic conditions that may be significantly associated with pre-eruptive dentin defects. In particular, the absence of systemic fluoride supplements in the majority of those affected was a notable feature, although the role of fluoride in the etiology of the defects is unclear.

As there is little evidence for systemic factors in the etiology of pre-eruptive dentin defects, it is likely that local factors are involved. One such factor which was found to be significant in the present study was ectopic positioning of unerupted teeth, a fact which had been also observed earlier in our previous study using bitewing radiographs.[3] Our present data showed that 28% of teeth with ectopic positioning were associated with pre-eruptive dentin defects, either in itself, or on an adjacent tooth. This suggests that abnormal eruption of a tooth may be a trigger factor in the initiation of pre-eruptive dentin defects. In addition, pre-eruptive dentin defects in teeth adjacent to ectopically positioned neighbours were also observed in a smaller number of subjects. Our findings are supported by examination of radiographs published in previous reports which have also showed that pre-eruptive dentin defects are often seen in ectopically positioned and impacted teeth, although this fact had not always been mentioned by the previous authors.[22-25]

We hypothesize that abnormal contact and pressure resulting from ectopic positioning cause breaks in the tooth follicle so that resorptive cells from the surrounding tissues may enter the dentin of the developing tooth through poorly coalesced enamel fissures. The fact that ectopic position occurred in only a percentage of teeth with defects suggests that other mechanisms may also be involved, or that the ectopic position was only transient. An alternative hypothesis is that functional abnormality of the cells involved in bone resorption and eruption of the developing tooth causes both ectopic position of the tooth and entry of the cells into the dentin.

Although other trigger factors for the initiation of resorption are still unclear, it has been speculated that local inflammation, such as that associated with pulpal infection of the primary teeth, may serve as initiating factors for the resorption.[5] However, the fact that many pre-eruptive dentin defects are found in permanent molars, which do not have primary predecessors obviates this hypothesis. In the present study, the highest prevalence of defects was found in the maxillary and mandibular first molars, which do not have primary predecessors. By contrast, the permanent teeth with primary predecessors such as the premolars, canines, and incisors showed the lowest prevalence of defects.

In contrast to a resorptive etiology, other authors have speculated that pre-eruptive dentin defects may originate as developmental anomalies in which parts of the tooth crown are not mineralized properly.[5,11,26] That this is an unlikely possibility has been shown by previous studies which demonstrated that the crown of an affected tooth appeared well mineralized prior to the later appearance of the pre-eruptive dentin lesion.[1] Furthermore, the fact that many of these lesions enlarge with time while unerupted points more to a resorptive nature rather than a mineralization defect which should remain unchanged.

Clinical management of pre-eruptive dentin defects depends on the lesion size at the time of detection, in relation to the expected time of emergence of the affected tooth. Unerupted teeth which show rapidly enlarging lesions, particularly when their emergence is not due for a period of time, should undergo surgical uncovering of the tooth crown, and curettage of the defects to halt the progress.[1,4] On the other hand, small lesions may be monitored until tooth emergence when routine restorations may be placed.

Conclusions

1. Pre-eruptive dentin defects may be detected from panorex radiographs at a subject prevalence rate of 3% and a tooth prevalence rate of 0.5%.
2. Preliminary clinical observations support the novel concept that these defects constitute a significant proportion of clinically undetected occlusal caries. Awareness of this poorly recognized condition points to the need for increased surveillance during radiographic examination of teeth in the pre-eruptive stages, so that early detection and treatment may be instituted.

References

1. Seow WK, Hackley D: Pre-eruptive resorption of dentin in primary and permanent dentitions: case reports and literature review. Pediatr Dent 18:67-71, 1996.
2. Seow WK: Multiple pre-eruptive intracoronal radiolucent lesions in the permanent dentition: case report. Pediatr Dent 20:195-198, 1998.
3. Seow WK, Wan A, McAllan L: The prevalence of pre-eruptive dentin defects from bitewing radiographs. Pediatr Dent 21:26-33, 1999.
4. Holan G, Eidelman E, Mass S: Pre-eruptive coronal resorption of permanent teeth: report of three cases and their treatment. Pediatr Dent 16:373-376, 1994.
5. Ignelzi MA Jr, Fields HW, White RP, Bergenholz G, Booth FA: Intracoronal radiolucencies within unerupted teeth: case report and review of the literature. Oral Surg 70:214-220, 1990.
6. Coke JM, Belanger GK: Radiographic caries-like distal surface enamel defect in an unerupted second premolar. J Dent Child 48:46-49, 1981.
7. Skaff DM, Dilzell WW: Lesions resembling caries in unerupted teeth. Oral Surg 45:643-646, 1978.
8. Giunta JL, Kaplan MA ;"Caries-like" dentin radiolucency of unerupted permanent tooth from developmental defects. J Pedodont 5:249-255, 1981.
9. Skillen WG: Intra-follicular caries. Ill Dent J 10:307-308, 1941.
10. Baab DA, Morton TH, Page PC: Caries and periodontitis associated with an unerupted third molar. Oral Surg 58:428-430, 1984.
11. Luten JR: Internal resorption or caries? A case report. J Dent Child 25:156-159, 1958.
12. Wood PF, Crozier DS: Radiolucent lesions resembling caries in the dentine of permanent teeth: a report of sixteen cases. Aust Dent J 30:169-173, 1985.
13. Rankow H, Croll TP, Miller AS: Pre-eruptive idiopathic coronal resorption of permanent teeth in children. J Endodont 12:36-39, 1986.
14. Grundy CE, Pyle RJ, Adkins KF: Intra-coronal resorption of unerupted molars. Aust Dent J 29:175-179, 1984.
15. DeSchepper EJ, Haynes JI, Sabates CR: Pre-eruptive radiolucencies of unerupted teeth: report of a case and literature review. Quintessence Int 19:157-160 1988.
16. Brooks JK: Detection of intracoronal resorption in an unerupted developing premolar: report of a case. J Am Dent Assoc 116:857-859, 1988.
17. Taylor NG, Gravely JF, Hume WJ: Resorption of the crown of an unerupted permanent molar. Int J Paediatr Dent 2:89-92, 1991.
18. Blackwood HJJ: Resorption of enamel and dentine in the unerupted tooth. Oral Surg 11:79-85, 1958.
19. Creanor SL, Russell JI, Strang DM, Burchell CK: The prevalence of clinically undetected occlusal dentine caries in Scot tish adolescents. Brit Dent J 169:126-129, 1990.
20. Kidd EAM, Naylor MN, Wilson RF: The prevalence of clinically detected and undetected molar occlusal dentine caries in adolescents on the Isle of Wright. Caries Res 26:397-401, 1992.
21. Browne WG: A histopathological study of resorption in some unerupted teeth. Dent Record 74:190-196, 1954.

22. Wooden EE, Kuftinec MM: Decay of unerupted premolar. Oral Surg 38:491-492, 1974.
23. Rubinstein L, Wood AJ, Camm J: An ectopically impacted premolar with a radiolucent defect. J Pedodont 14:50-52, 1989.
24. Baddour HM, Tilson HB: A carious impacted third molar. Oral Surg 48:490, 1979.
25. Nickel AA, Wolske EW: Internal resorption of four bony impacted third molars. Oral Surg 49: 187-190, 1980.
26. O'Neil KM, Ground TG, Cohen DM: Pre-eruptive idiopathic coronal resorption. A case report. J Endodont 23:58-59, 1997.

Abstract of the Scientific Literature

S urgical Extrusion of a Cervically Root-Fractured Tooth

A case report describing extensive treatment on a 10-year-old male who had experienced dental trauma two years earlier. After apexification on the maxillary right permanent central incisor (with calcium hydroxide + barium sulfate in a 8:1 ratio with glycerin), the patient re-traumatized the area, fracturing the same incisor below the alveolar crest. Radiographs indicated a closed apex and no pathology. A decision to surgically extrude the tooth was made. The incisor was extruded approximately 4 mm and immobilized with interdental sutures and a surgical dressing. After healing and further canal treatment, a ParaPost® was bonded/cemented with Ketac-Silver® and a porcelain veneer crown was completed. Twenty-seven month reevaluation was satisfactory.

Comments: An extremely well written and detailed case report describing the 'heroic' efforts and frustrations, including, trauma to a tooth undergoing treatment, failed appointments, lost temporaries, debris in the canal, etc., that all dentists face at some point. A satisfactory clinical outcome is evident, on presented radiographs, in spite of a crown-to-root ratio of approximately 1:1. Use of such a technique, or orthodontic extrusion (also briefly mentioned), would be beneficial in helping to maintain a more natural level of bone and periodontium for future consideration of a dental implant. RFM

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Surgical Extrusion of a Cervically Root-Fractured Tooth after Apexification Treatment. Gali_kan, MK: J Endondon 25(7):509-513, 1999.

15 references

Abstract of the Scientific Literature

The Pediatrician's Role in Parenting

Pediatrics and pediatric dentistry are closely interrelated. However, the two specialties remain very much apart. The triad of patient, parent and dentist remains the challenge of the next millennium. It is interesting to observe how pediatricians define their role in this triad. This issue is dedicated to the pediatrician's role in parenting. Among the issues discussed are the pediatricians role in providing parents with guidance and support in parenting, dealing with the diversity of the modern family (marital status and sexual orientation), helping children with psychosocial problems, utilizing the "well child visit" (equivalent to our infant visit) to observe failure to thrive, child abuse, and infantile psychiatric disturbances. Another interesting aspect described is encouraging fathers to be more involved in their child's parenting.

Comments: Pediatric dentistry has dealt with patient management with much success, perhaps outshining our medical colleagues. The new challenge is parent management. This issue opens up a window into the pediatricians role in parenting—a role we could share. AK

The Pediatrician's Role in Parenting. Howard BJ. Guest editor: Pediatric Annals, Volume 27, January 1998.