Pre-eruptive Intra-Coronal Resorption: Controversies and Treatment Options

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Pre-eruptive *intra-coronal* resorption (PIER) *is a defect located in the dentin of an unerupted tooth, just beneath the dentin-enamel junction, with a prevalence of 0.5-2% of the teeth. The depth of the lesion is variable and may also reach the pulp. In the past, these lesions were confused with caries, and were therefore called "hidden" or "pre-eruptive caries". These defects are usually detected incidentally in routine dental radiographs. It has been proven that in the pre-eruptive stage the lesions contain soft tissue and inflammatory cells. The present report describes the clinical management of a case of PEIR on a mandibular first permanent molar and discusses the alternatives for treatment.*

Key words: Pre-eruptive *intra-coronal* resorption, children, management.

INTRODUCTION

Pre-eruptive intra-coronal resorption is a defect located in the dentin of an unerupted tooth, just beneath the dentin-enamel junction[1]. The defect is usually located on the central or mesial portion of the crown. The depth of the lesion is versatile and not often involves the pulp. Pre-eruptive intra-coronal resorption can be diagnosed by routine radiographic examination[2]. However, since one cannot always get a most favorable view of the molars, the lesion might sometimes be overlooked. As these lesions look like caries, they were often mistakenly diagnosed as "pre-eruptive caries", but there is a lack of histopathological proof for this theory [3]. Currently the accepted term is pre-erupted intra-coronal radiolucency /resorption (PEIR). These defects are usually detected incidentally in routine dental radiographs [2].

The prevalence of PEIR is of 3-6% of the patients and in 0.5-2% of the teeth[1, 3, 4]. A single tooth is most commonly affected, but cases with several teeth have also been reported. Molars and premolars are the most commonly affected teeth and only one case has been reported in the primary dentition[2]. A correlation was found between ectopically positioned teeth and pre eruptive resorption[1].

The pathogenesis of pre-eruptive intra-coronal resorption was unclear for many years. Presently there is enough clinical and histological evidence to support that in the pre-eruptive stage these lesions contain soft tissue[5]. Histological examination frequently reveals signs of resorption such as scalloping of the lesion margins and the presence of multinucleated giant cells, osteoclasts and chronic inflammatory cells [1].

A complete revision of all the relevant literature on PEIR has been published by Counihan and O'Connell in 2012[2].

The aim of the present report was to describe the clinical management of a case of PEIR on a mandibular first permanent molar and discuss the alternatives for treatment.

Case Report

An asymptomatic healthy 6 year old boy was referred to the Department of Pediatric Dentistry Clinic of the Hadassah Faculty of Dental Medicine by his pediatric dentist. While examining a bite-wing radiograph the dentist disclosed an intra-coronal radiolucency in the unerupted right first mandibular molar (tooth no. 46). The lesion was located in the middle portion of the dentin. The other three first permanent molars have erupted normally. As the radiolucency in the dentin was extensive, possibly of resorptive nature and in proximity to the pulp it was decided to intervene and explore the lesion (Fig.1 A and B).

The patient was treated under inhalation sedation with nitrous oxide (N_2O-O_2) and the procedure was performed in conjunction with an oral surgeon. The gingiva and the tooth were anesthetized with 2% Lidocaine and 1:100000 Adrenaline and an incision was made in the gingiva to expose the tooth. The resorption was found in the occlusal and lingual surfaces of the tooth . The mushy dentin was carefully removed with an excavator and there was no exposure of the pulp (Fig.2). A sample of the removed tissue was sent for pathological examination. A resin modified glass monomer lining (Vitrebond) was placed on the pulpal wall and the tooth was restored with glass ionomer cement (Fuji9). Chlorhexidine mouthwashes were prescribed for one week.

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Figure 1A. Preoperative view of the unerupted first permanent molar.

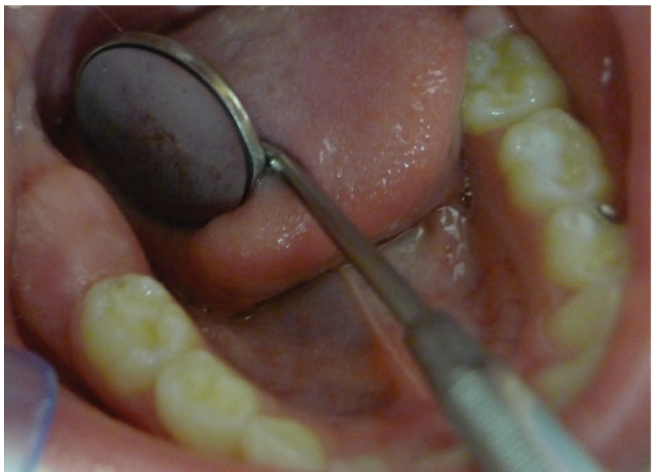


Figure 1B. Preoperative radiograph of the tooth. Note the extensive resorption and the proximity to the pulp.

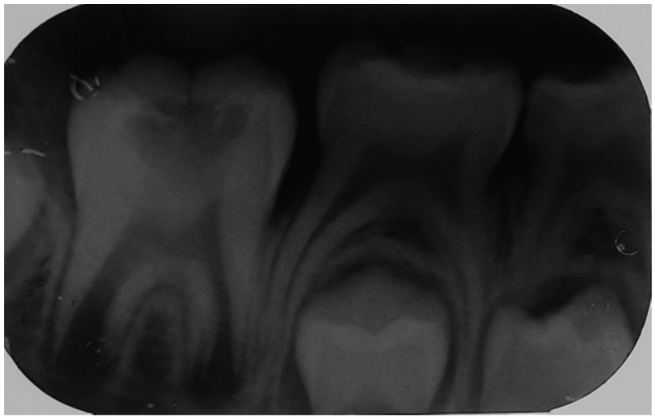


Figure 2. The lesion was found in the occlusal and lingual surfaces. Notice the large cavity after removal of the mush.

Figure 3A. Clinical photograph three months post treatment. The stained margins of the restoration were freshened and restored with glass ionomer cement.

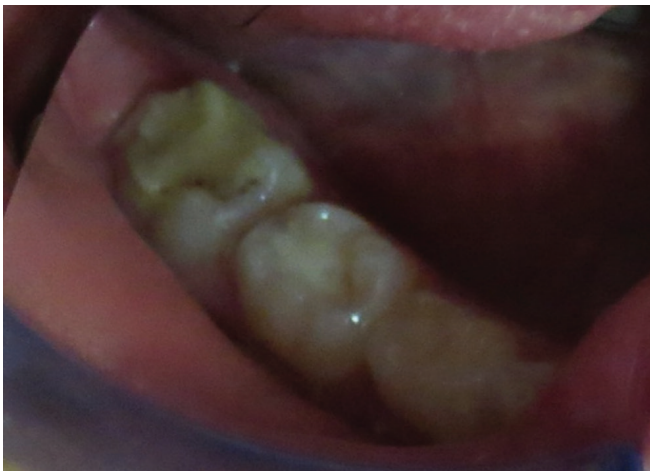


Figure 3B. Radiograph at three months post treatment. Note the normal development of the tooth, evident by the lengthening and thickening of the roots.

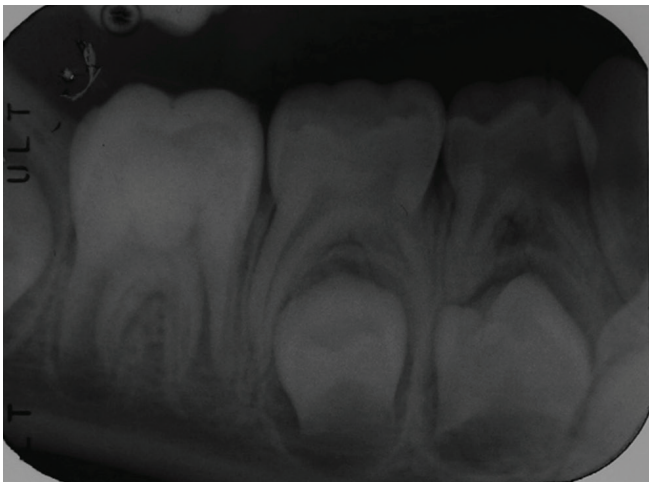
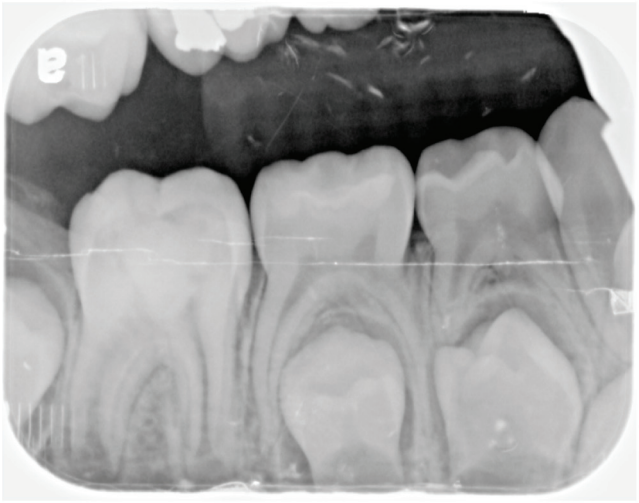


Figure 4A. Clinical photograph one year post- surgery. The restoration is unimpaired.

Figure 4B. Radiographic appearance one year post- surgery. Continuation of root development is evident.



Three weeks after the procedure there were no adverse effects, the oral hygiene was good and gingival healing could be observed. The laboratory findings of the removed tissue were: connective tissue, bone and granulation tissue.

Three months later the tooth was checked for the integrity of the filling and some staining of the margins was observed. The margins were freshened and restored with glass ionomer (Fig.3A) The periapical radiograph taken at the same occasion revealed a normal root development (Fig.3B). Clinical and radiographic follow- up one year post-surgery revealed that the restoration was unimpaired and there was continuation of root development (Figs. 4 A and B).

DISCUSSION

Sometimes crevices, folds and pits on the occlusal surface may developmentally lack the protective enamel cover. This may have been due to the presence of a minute gap in the integrity of the inner enamel epithelium, from which amelogenesis is initiated.

In these microscopically small areas, the outer surface of the crown is comprised of exposed dentine and, thus, becomes a high risk site for the development of early caries, within a short time after the tooth erupts. Pits and fissures are particularly prone to caries and much of the preventive pediatric dentistry is concerned with avoiding this eventuality.

In the pre-eruptive stage and while still hermetically sealed off within its protective dental follicle, the presence of these minute gaps in enamel formation also make the tooth vulnerable to the initiation of a resorptive process. The intracoronal resorption process attacks the unprotected dentin at this tiny site and advances[6].

The process is nourished from within the dental follicle and not from the dental pulp. The progress of the lesion is stopped short of the pulp by the predentin layer and it has no relation to caries. The resorptive process rapidly progresses through the dentin, but will resorb the enamel at a much slower rate probably due to its very much higher calcified structure.

When the tooth erupts or when its crown is exposed surgically, the lesion loses its nutrient supply line and its vital elements necrose, leaving an inert and dead mush within the crown of the tooth. This dead mush is harmless but it may later be secondarily affected by dental caries. For this reason it needs to be treated soon after eruption and it is probably sufficient to use a composite fissure sealant, without the need to prepare the cavity or excavate the mush in any other way. Becker claims that this approach may offend the sensitivities of the pediatric dentist, but it should be remembered that complete excavation of the resorbed area may require widely opening the occlusal or other surface of the tooth and could well risk accidental pulp exposure – particularly due to the broad pulp chamber that is characteristic of a recently erupted tooth[6]. Conversely, leaving the mush and sealing over the occlusal surface may not be strong enough to support and withstand occlusal forces. Counihan and O'Connell described a case of PEIR that was sealed and monitored for 5 years and ended up being restored with a stainless steel crown after having fractured the cusp overlying the lesion[2].

When a PEIR is diagnosed it is important to consider whether to treat surgically the tooth promptly or to leave the patient for a follow up and wait until the tooth erupts.

It is important to distinguish between a progressive lesion and a static one. The decision whether to treat or not depends on the progression of the lesion and its proximity to the pulp.

In the present case a PEIR was discovered in a mandibular first permanent molar while taking bite-wing X-rays for caries detection. The radiolucency was close to the pulp and therefore required an immediate treatment. As the radiolucency was extensive and conversely to Becker's recommendation, it was decided to surgically expose the tooth, remove the mush and restore it with glass ionomer cement.

When treating an unerupted tooth, the use of glass ionomer cement is useful and has the advantages of releasing fluoride, bonding to tooth and in addition a glass ionomer can be used in a wet environment [7]. It was found that the bond strengths of glass ionomer cements did not appear to be affected by the presence of fluid under physiologic pressure [8]. Moreover, recent studies have shown that additional energy (heat) during setting will not only decrease the setting time but will also increase the strength and chemical stability[9, 10].

CONCLUSION

It is important to diagnose a pre eruptive intra-coronal resorption so prompt treatment is instituted when required in order to prevent pulp involvement.

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