# Treatment of Severe Pre-eruptive Intracoronal Resorption of a Permanent Second Molar

Esti Davidovich, DMD, MSC  Bruno Kreiner, DMD  Benjamin Peretz, DMD

*Dr. Davidovich is a postgraduate student, Department of Pediatric Dentistry, Dr. Kreiner is staff member, Department of Oral and Maxillofacial Surgery, and Dr. Peretz is clinical associate professor, Department of Pediatric Dentistry, The Hebrew University-Hadassah School of Dental Medicine, Jerusalem, Israel. Correspond with Dr. Peretz at Benny@cc.huji.ac.il*

## Abstract

Pre-eruptive intracoronal resorption is a lesion often located within the dentin, adjacent to the dentin-enamel junction, in the occlusal aspect of the crown. As the lesions resemble caries, they are often referred as "pre-eruptive caries." The purpose of this case report was to describe the diagnosis and treatment of a permanent molar with pre-eruptive intracoronal resorption and to elaborate on possible associated clinical problems. After surgical exposure of the unerupted tooth, the tooth structure in the resorbed area was removed and the tooth was restored with glass-ionomer material. Three months after the treatment, partial pulpotomy had been performed and the restoration was replaced by amalgam. Elaboration on possible associated clinical problems is provided. (*Pediatr Dent.* 2005;27:74-77)

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The prevalence and etiology of pre-eruptive intracoronal resorption has been recently reported in several studies.[1-7] These lesions are often located within the dentin, adjacent to the dentin-enamel junction, in the occlusal aspect of the crown. As the lesions resemble caries, they are often referred as "pre-eruptive caries."[8]

The pathogenesis of pre-eruptive intracoronal resorption is unclear, since the developing tooth is encased in its crypt and is not likely to be infected with cariogenic microorganisms.[1] It has been suggested that local factors play an important role in the etiology. Ectopic positioning of affected teeth or the adjacent abutting teeth can cause local pressure that may be an inciting factor for resorptive cells to invade the dentin through enamel fissures or via the cementoenamel junction.[1,5,6] Histological examination of the lesion's soft tissue revealed signs of resorption, including resorptive cells (osteoclasts and macrophages) and scalloped lesion borders.[3-6,9,10]

It has been suggested that this lesion might have originated as a developmental anomaly in which sections of the tooth failed to mineralize properly. This theory, however, has been subsequently disproved lately.[3] The retentive nature of the cavitated lesion favors caries development, and the lesion becomes distinguishable as a carious lesion once it is exposed to the oral cavity.[1]

The prevalence of pre-eruptive intracoronal resorption is 2% to 6%, depending on the tooth and radiographic technique. When bite-wings are used, the prevalence is 4% for the permanent mandibular first molar, 2% for the mandibular first premolar, and 1% for the permanent maxillary first molar, maxillary first premolar, and mandibular second molar.[1]

In contrast, when panoramic radiographs are available, pre-eruptive intracoronal resorption has been found in 4% of permanent maxillary first molars and in 3% of permanent mandibular first molars. Usually, a single tooth is affected in an individual.[3] Nearly half of the lesions extend to more than two thirds of the dentin's width.[6] No association was found between pre-eruptive intracoronal resorption and gender, race, medical conditions, systemic factors, or fluoride supplementation.[1,5,6]

The purpose of this case study was to describe the diagnosis and treatment of a permanent molar with pre-eruptive intracoronal resorption and to elaborate on possible associated clinical problems.

## Case report

An 11-year-old-girl was referred by her dentist to the department of pediatric dentistry at the Hebrew University-Hadassah School of Dental Medicine in Jerusalem. The referring dentist

noticed a large radiolucent area underneath the occlusal dentoenamel junction of the unerupted permanent mandibular left second molar on a panoramic radiograph, which was taken for orthodontic reasons (Figure 1). Medical history revealed no systemic disease or allergies. Clinical examination revealed the alveolar mucosa distal to the first molar with normal color, texture, and contour. A periapical radiograph demonstrated the unerupted mandibular second molar with a clear radiolucent area in the crown extending from the occlusal surface into the dentin (Figure 2). No periapical pathology had been observed. Pre-eruptive intracoronal resorption was diagnosed, and the decision was made to remove the defective tooth structure in the resorbed area and restore the tooth.

After administration of local anesthesia (1.8% lignocaine with 1:100,000 adrenaline), the gingival tissue above the unerupted molar was surgically retracted, revealing the occlusal surface of the second molar (Figure 3). A probe was inserted through the occlusal fissures into the resorbed area, and caries–like soft tooth structure was detected. While retracting the gingival tissue from the tooth, an opening to the cavity was made with a high-speed bur and the caries-like tissue was removed with a low-speed round bur. The remaining tooth material appeared white and hard.

The cavity floor was lined with glass inomer (Vitrebond, 3M, ESPE, St. Paul, Minn) and glass inomer (GC Fuji IX–GP, GC, Tokyo, Japan) was used to restore the tooth (Figure 4). The gingival tissue was replaced and sutured with a resorbable suture, exposing some of the buccal aspect of the tooth.

In a follow-up examination 1 week later, emergence of the buccal cusps of the tooth and fibrin healing tissue were detected. Three months later, as the tooth erupted (though not fully exposed), dental plaque was evident around the tooth. The gingiva was red and swollen and bleeding occurred when plaque was removed. The patient complained of sensitivity to cold in the treated tooth. Clinical examination revealed intact margins of the restoration. A periapical radiograph showed a radiolucent area underneath the restoration (Figure 5).

Local anesthesia was administered, and a rubber dam was placed using a 14A clamp, which helped retract the gingiva. Nevertheless, a completely dry area could not be achieved. The restoration was removed, and the cavity floor was carefully cleaned with a round low-speed bur. Pulp exposure had been noticed on the mesiobuccal area. Partial pulpotomy with calcium-hydroxide was performed, followed by placement of reinforced zinc-oxide eugenol dressing (IRM–LD Caulk, Dentsply Milford, Del) and an amalgam restoration. Six-month follow-up revealed no clinical symptoms and normal appearance of the tooth and restoration. A radiograph demonstrated continued root development (Figure 6).

## Discussion

The present case demonstrated an accidentally diagnosed, asymptomatic, pre-eruptive, intracoronal resorption of a mandibular second molar on a panoramic radiograph taken for orthodontic reasons.

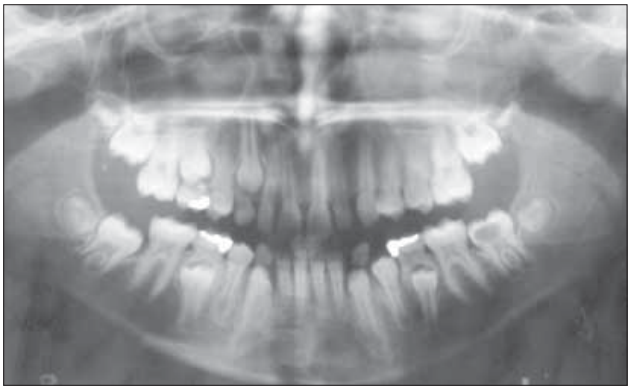

Figure 1. A large radiolucent area underneath the occlusal dentoenamel junction of the mandibular left second molar on a panoramic radiograph taken for orthodontic reasons.

Figure 2. A periapical radiograph demonstrating the unerupted mandibular second molar, with a clear radiolucent area in the crown, extending from the occlusal surface into the dentin.

Figure 3. The gingival tissue above the unerupted molar surgically retracted, revealing the occlusal surface of the second molar.

Pre-eruptive intracoronal resorption has been previously described as located adjacent to the dentin-enamel junction, and extending into various depths of the dentin. [5,6] The dental literature generally recommends surgical exposure of the unerupted tooth—as soon as the lesion has been diagnosed radiographically—to arrest the progression of the resorptive process and prevent its penetration into the dental pulp.[2,3,5,6,11] In this case study, the extensive radiolucent area under the enamel on the unerupted tooth required an

Figure 4. Cavity restoration with glass-inomer, (GC Fuji IX–GP, GC, Tokyo, Japan).

Figure 5. A periapical radiograph showing a radiolucent area underneath the restoration and on its mesial aspect.

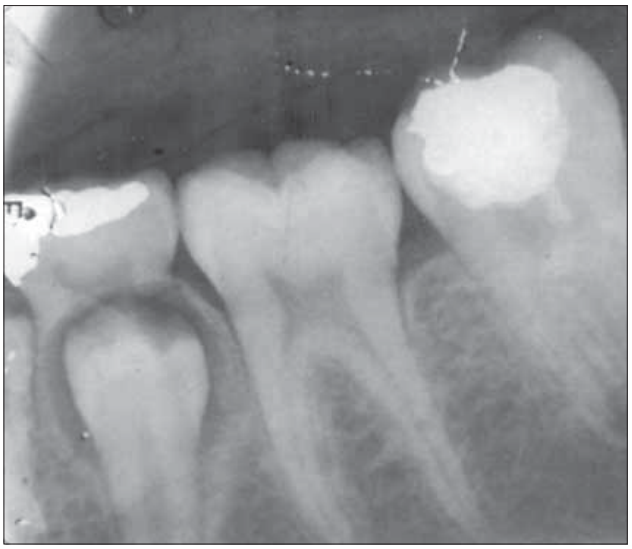

Figure 6. A periapical radiograph taken 6 months after the partial pulpotomy. Continued root development is evident.

immediate intervention due to a concern of pulp involvement.

Glass-ionomer was chosen as the restoration material for the tooth after its surgical exposure due to its benefits:

1. less sensitivity to moisture (because of the wet working field);
2. minimal tooth preparation;
3. fast setting;
4. high viscosity, which allowed for easy handling and packing as well as stronger bonding to enamel and dentin, without etching, via photochemical reaction;
5. fluoride release into the cavity.[12,13]

The gap between the tooth and restoration (Figure 4) may be attributed to shrinkage of the restoration material or lack of its proper condensation.

A possible explanation for the sensitivity, which was reported 3 months later, is that the removal of the caries-like material was incomplete, and bacteria may still have remained in the dentinal tubules on the cavity floor despite its sound appearance.

Due to their proximity to the pulp and the tooth's immaturity, the dentinal tubules may have been more permeable than in mature dentin. Thus, remaining bacteria could have easily progressed into or close to the pulp, thereby irritating it. Partial pulpotomy was performed, as this procedure appeared successful in treating a carious exposure in permanent molars.[14] Amalgam was chosen as the restorative material following the partial pulpotomy, due to its handling characteristics, good performance in preventing marginal leakage, and decreased sensitivity to moisture.[15]

## Conclusions

1. Early diagnosis and treatment of pre-eruptive intracoronal resorption are essential to avoid pulp involvement after tooth eruption.
2. Immature dentin of young teeth must be considered a potential source for pulp inflammation even though it appears sound after caries removal.

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## Abstract of the Scientific Literature

### Effects of Saliva on Marginal Integrity of Pit and Fissure Sealants

Pit and fissure sealants have been widely used since the 1970s, with continuous advances made in: (1) materials; (2) ease of placement; and (3) rate of retention. Salivary contamination can adversely affect the sealant bond integrity. Therefore, many experts suggest that an adjunct adhesive or glass ionomer cement be used to try and decrease, if not eliminate, sealant failure. The purpose of this study was to assess the marginal microleakage of glass ionomer cement and a resin-based sealant associated or not with an adhesive system, under salivary contamination.

Forty-eight human third molars were divided into 3 groups, according to sealant material: (1) Fluroshield; (2) Single Bond and Fluroshield; and (3) Ketac-fil. Each group was then subdivided in half, with 8 specimens serving as a control and the other 8 being exposed to salivary contamination. For the control group, the sealant material was applied to the occlusal surface after being etched and air dried. For the subgroup with saliva contamination, the occlusal surface was exposed to fresh human saliva for 20 seconds after etching. The surface was then air dried, and sealant placement occurred. Materials were placed according to manufacturers instructions. Samples were: (1) stored in distilled water for 24 hours; (2) subjected to thermocycling; (3) treated with a dye solution; and (4) sectioned for observation under a microscope. The results showed that the salivary contamination subgroups had a higher percentage of marginal leakage than the control. Within the saliva contamination subgroups, only the Single Bond plus Fluroshield provided complete marginal sealing. Furthermore, the glass-ionomer cement yielded the best result when compared to the sealant material alone.

Comments: Although the sample size was rather small, this study's results substantiate the deleterious effect of salivary contamination during sealant placement, particularly when a resin-based sealant is used alone. The addition of an adhesive agent improved the marginal seal, but has the drawback of added steps and time. In cases involving an active child or copious salivary flow, or when lack of time is a problem, the glass ionomer material seems to be well suited for the job and should be considered as an alternative material. As practitioners constantly strive to reduce sealant failure, this study could provide added insight—ultimately benefiting both patient and practitioner. GM

*Address correspondence to Dr. Maria Cristina Borsatto, Faculdade de Odontologia de Ribeirao Preto/USP, Departamento de Clinica Infantil, Odontologogia Preventiva e Social, Av. do Café, S/N Monte Alegre, CEP: 14040-904 Ribeirao Preto- SP, Brazil.*

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