

Non-cavitated dental radiolucent lesions: A challenge for the dental healthcare provider



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Pre-eruptive intracoronal radiolucencies (PIR) and post-eruptive hidden caries (PHC) are non-cavitated intracoronal dental lesions that are usually detected only through radiographic observation. As a result, these lesions present numerous challenges for the dental healthcare provider that markedly differs from that of other non-cavitated dental lesions (early/incipient/demineralized white spots). Best practice principles should be employed, for example, timely recognition and radiographic surveillance/observation, logical treatment management, along with judicious communication amongst all parties involved (parent/guardian, pediatric dentist and orthodontist). This article attempts to review and discuss the literature of these conditions and present a case report of a patient with PIR. (Semin Orthod 2016; 22:185–192.) © 2016 Elsevier Inc. All rights reserved.

Introduction

“**B**y definition, dental caries is an infectious and transmissible disease because it is caused by bacteria colonizing the tooth surfaces.”¹ It causes dental structural destruction by the constant exposition of the enamel and dentin to acids.

The incidence of untreated dental decay in children has fallen, credited mostly to the increase in (a) awareness by caretakers and pediatricians, (b) the use of preventative measures, such as, sealants and fluoride, and (c) the number of pediatric dentists. Despite these positive strides in prevention, caries still remains a damaging process.²

Unlike typical caries, which involve cariogenic bacteria and are found clinically, pre-eruptive intracoronal radiolucencies (PIR) and post-eruptive “hidden” caries (PHC) can be missed even with careful dental examination with a mirror and explorer. Both non-cavitated entities can only

be diagnosed radiographically, that is, panoramic, periapical and bitewing x-rays, and appear as radiolucencies in the crowns of teeth. And as their names imply, the major difference between the two is that one occurs prior to dental emergence into the oral cavity, while the other after eruption. In addition, their etiology and treatment modalities slightly differ. This article will review the literature associated with both and report on a case of PIR.

Historical perspective

Pre-eruptive intracoronal radiolucencies (PIR)

First described by Skillen³ in 1941, by definition pre-eruptive intracoronal radiolucencies (PIR) are lesions that are only detected radiographically before eruption. The lesions are often found in the dentin only and adjacent to the dento-enamel junction of unerupted teeth^{4,5} (Fig. 1).

Post-eruptive hidden caries (PHC)

Nearly 40 years later, in the 1980s, the term “hidden caries,” or occult caries, was first used to describe a lesion that completely differed from the traditional development of dental caries.⁶ The entity could not be detected on routine clinical exam, as the occlusal enamel surface of teeth with these lesions appeared to be healthy and/or minimally demineralized. However, they were visualized in dentin mainly by means of

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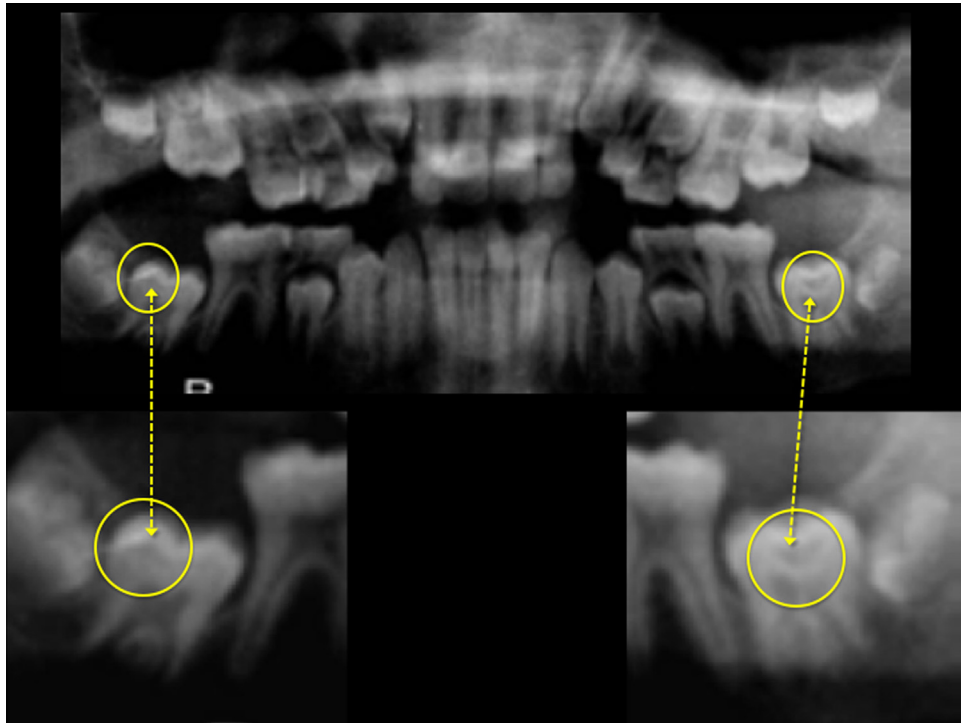


Figure 1. Example of Pre-eruptive intracoronal radiolucency (PIR). Panoramic radiograph of a 10-year-old patient with radiolucencies observable on both unerupted second permanent mandibular molars.

bitewing and periapical radiographs (Fig. 2). It has been assumed that these lesions slowly progress in dentin, often resulting in compromised pulpal tissue (Fig. 3).

Prevalence

Pre-eruptive intracoronal radiolucencies (PIR)

As would be expected, most of the information on PIR prevalence has been derived from radiographic studies with results varying dependent upon the type of x-rays utilized (Table). In a study using bitewing radiographs, Seow et al.⁴ found the prevalence to be 6% in nearly 2000 children with a few subjects exhibiting lesions in more than one tooth. Seow et al.,⁵ using panoramic radiographs, found the prevalence to be 3% by subjects or 0.5% of unerupted permanent teeth, most commonly occurring in maxillary (4%), and mandibular (3%) first molars. In bitewings, PIR lesions tended to be most visible in the mesial and central aspects of the mandibular first molars (4%) while in distal of premolars (2%).^{4,5} Although occurrence in the primary dentition is unknown, Seow and Hackley did report

the first known case in a second primary mandibular molar in a 2.5-year-old girl. Treatment for this tooth was extraction secondary to a dental abscess.⁷

There were no gender or racial predilections noted, nor association with medical conditions or fluoride uptake/supplementation.^{4,5} Interestingly, the incidence of PIR appears to be correlated with the presence of ectopic teeth as, Seow et al.^{4,5} found a rate of 14% in bitewings and 28% in panoramic radiographs compared to 2% with non-ectopic teeth. Seow hypothesized that pressure from the malposed unerupted tooth may provoke pre-eruptive defects.

Post-eruptive hidden caries (PHC)

Allan and Naylor⁸ carried out the first radiographic study finding the prevalence to be 22% in 858 first molars. Later studies have suggested prevalence ranging from a low of 1.4 to as high as 50% in permanent molars with a greater incidence in mandibular molars.⁸⁻¹⁴ One study suggested that lesions became more common as the age of the child increased.¹⁴ However, the marked variation observed needs to be viewed in light of the lack of

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