Hidden Caries: A Case Report of a 17 Years Old Male with Two Affected Mandibular Premolars

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Hidden caries is the term used to describe carious lesions that are not visualized clinically on erupted teeth but can be detected radiographically. The exact etiology remains an area of controversy. The purpose of the current case report was to discuss the diagnosis and treatment of two mandibular premolars with hidden caries. After diagnosis was established, both premolars were treated with indirect pulp caps and resin-based composite restorations. A one year follow up appointment revealed both teeth to be free from signs and symptoms of inflammation.

Keywords: caries, eruption, resorption

INTRODUCTION

Carious lesions on non-smooth surfaces are usually detected by visualization and tactile sensation using an explorer. Radiographs are used to determine the progression of such lesions into the dentin[1]. The description "hidden caries" was first used in 1986 for dental caries that is completely different from the classical lesions in nature [2]. The term that was used is occult caries. "Hidden/Occult" caries is defined as any occlusal lesion that can't be visualized on the enamel surface, however can be seen clearly on routine radiographs as radiolucencies in the dentin layer [3,4].

The prevalence of such lesions was found to be from 2.2% to 50% of permanent molars [3]. It's been reported in premolars [5] and in primary molars as well [6,7]. The exact etiology of 'hidden caries' remains a controversy. Some theories have been suggested including defective enamel and its specific microbiology and the use of fluoride [3,4,8]. Hidden caries is thought to be initiated in one of the following areas: at the fissure's entrance, near the fissure's base or on its walls [9].

A study reported that *Streptococcus mutans* and *lactobacilli* were found in the lesions. Thus, it's been suggested that they have the same microbiological profile as classical carious lesions [10]. One of the theories suggested that hidden caries is a consequence of fluoride use and "Fluoride bombs" or "fluoride syndrome" were used as terms to describe occult/hidden caries [2].

This theory was based on the belief that fluoride remineralizes early enamel lesions which makes it look intact. However, the disease process progresses in the dentin [11-] and appears as radiolucency in the dentin during radiographic examination.

On the other hand, the association between fluoride exposure and the prevalence of hidden caries in two different cities in the Netherlands was investigated. The city with the optimal fluoridation system had a 31% lower prevalence of hidden caries [13] Another theory hypothesized that hidden caries is the same as pre-eruptive intra-coronal resorption lesions [3]. This was based on the fact that some studies reported that patients with hidden caries had the same lesions prior to teeth eruption. This was confirmed when old radiographs of the same patients were re-examined [14]. Additionally, when newly erupted intact teeth with caries like lesions in the radiographs were examined histopathologically, resorption was detected in the enamel and dentin which is highly suggestive that hidden caries has been present prior to eruption as pre-eruptive intracoronal radiolucency [7].

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The most likely hypothesis is coronal resorption due to ectopic eruption. An abnormal position may cause pressure that may induce damage to protective coverings of the tooth. This will cause resorptive cells, including osteoclasts, multinucleated giant cells, and chronic inflammatory cells to enter the tooth through the reduced enamel epithelium and initiate resorption [14-16]. Histological specimens have shown the presence of these resorption cells along with scalloped margins [14,15].

Pre-eruptive intra-coronal resorption is detected incidentally during radiographic examination [17]. Thus, radiographs remain the most effective supplemental technique to detect such lesions [5].

The time of intervention may vary depending on the depth of the lesion. Small lesions may be monitored until the teeth are erupted. However, when lesions are large enough to approach the pulp, teeth should be exposed surgically and restored to protect the vitality and enhance the root development [16]. The purpose of this case report was to discuss the diagnosis and proper treatment of hidden caries affecting one mandibular first premolar and one mandibular second premolar within the same patient.

Case report

17-year-old healthy male presented for a comprehensive examination in the pediatric dentistry clinic at the University of Texas Health at San Antonio. During the visit, the patient denied any pain or sensitivity and did not have any complaint. Clinical examination showed generalized moderate gingivitis with calculus deposition on the lingual surfaces of the mandibular anterior teeth and heavy staining. No occlusal caries or previous restorations were found. The left second mandibular premolar (#35) (Figure 1) presented with a dark shadow underneath the intact enamel and the right first mandibular premolar (#44) (Figure 2) had an intact crown with no visible enamel caries or defects. Bite-wing radiographs demonstrated radiolucencies in the crowns of teeth #35 and #44. The radiolucencies extended half way through the dentin. (Figure 3).

Figure 1. The left second mandibular premolar (#35) presented with a dark shadow underneath the intact enamel.

Figure 2. The right first mandibular premolar (#44) had intact crown with no enamel carries or defects.

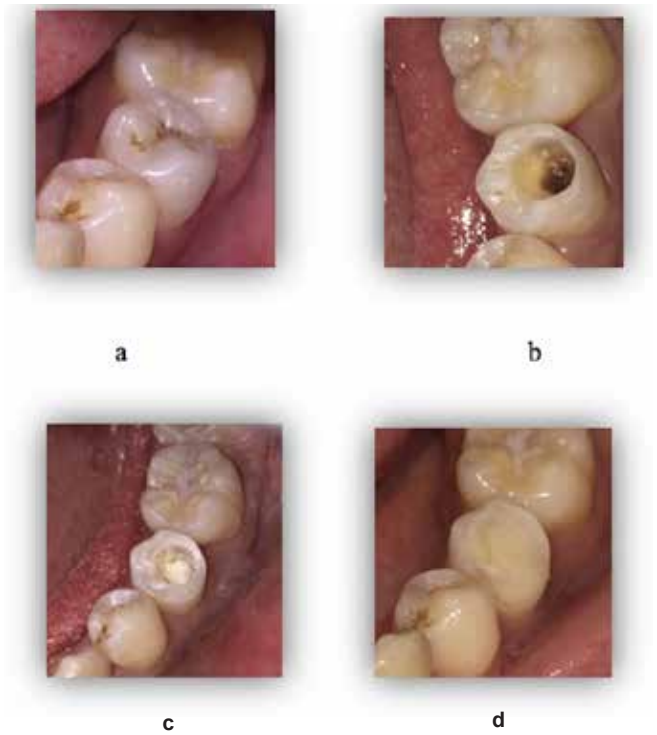
Figure 3. Bite-wing radiographs demonstrated radiolucencies in the crowns of teeth #35 and #44. The radiolucencies extended half way through the dentin.

Examination was conducted with 3.5 loups, light and a sharp explorer using tactile sensation. The diagnosis of pre-eruptive intra-coronal resorption/hidden caries was made. It was decided to treat the affected teeth with resin-based composite restorations with possible indirect pulp capping if deemed necessary.

The patient was treated in two separate appointments. The following procedure was done for both teeth:

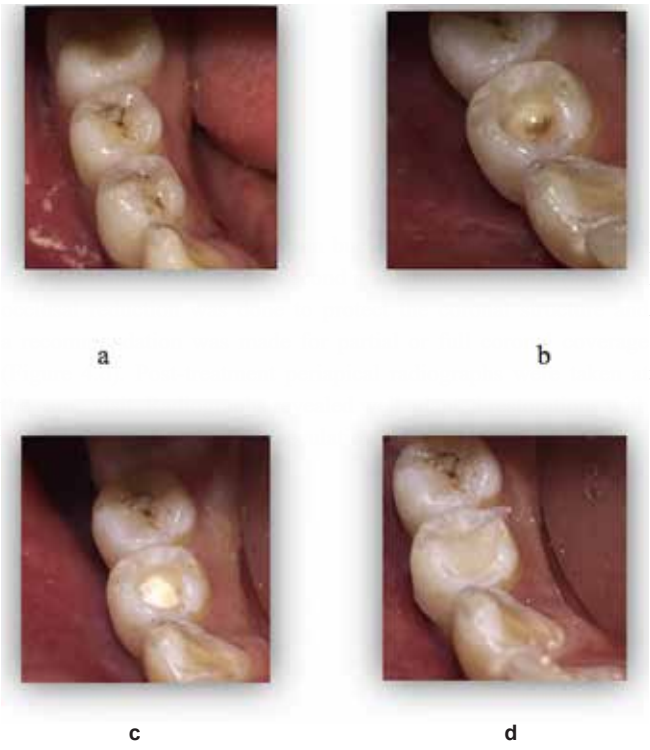
Local anesthesia was administered, utilizing 2% lidocaine with 1:100.000 epinephrine, using an inferior alveolar nerve block technique. The affected tooth was entered through normal enamel with a high- speed handpiece and caries-like soft tissue was detected. The walls of each cavity were cleaned using a high-speed bur and the floors were cleaned with a large low speed round bur. A layer of affected discolored dentin was left on the pulpal floor. (Figures 4.b and 5.b)

Figure 4. (a. b. c. d.); f.a: Pre-operative photograph of #35. 4.b: A layer of affective discolored dentin was left on the pulpal floor. 4.c: a very small amount of Dycal® Ivory (Dentsply, York, PA) was placed on the deepest point of the floor covered by a layer of resin-modified glass ionomer. 4.d: An occlusal reduction was done to protect the coronal tooth structure.



For tooth #35 only, a very small amount of Dycal[å] Ivory (Dentsply, York, PA) was placed on the deepest point of the floor covered by a layer of resin-modified glass ionomer (Figure 4.c). Tooth #44 was treated using an indirect pulp capping technique with resin-modified glass ionomer (3M ESPE Vitrebond™, St. Paul, MN) (Figure 5.c). The rest of the cavity was etched using 35% phosphoric acid (Ultra-Etch, Ultradent Products, Inc., South Jordan, UT). Prime and adhesive (Adaper Scotchbond™ Multi-purpose, 3M ESPE, St. Paul, MN) were applied and cured according to manufacturer's instructions. The cavity was filled with shade A2 of Z100™ restorative material (3M ESPE, St. Paul, MN). Occlusion was checked for the right first mandibular premolar (#44) (Figure 5.d).

Figure 5. (a, b, c, and d); 5. a: Pre-operative photograph of #44. 5. b: A layer of affected discolored dentin was left on the pulpal floor. 5.c: Indirect pulp capping technique with resin-modified glass ionomer. 5.d: Occlusion was checked for #44.



The patient was seen for a follow up appointment after one year and he was asymptomatic. Clinical examination revealed normal response to percussion, palpation and cold test for both teeth, as well as for control teeth that had not received restorations. Probing depths were within normal limits and no mobility noticed. Both restorations were intact with no discoloration or any signs of marginal leakage (Figures 8.a and 8.b). One year follow up periapical radiographs of #35 and #44 showed normal periodontal ligament space, surrounding bone trabeculation and periapical area. (Figures 9 and 10).

Figure 6. Post-treatment periapical radiograph of #35 revealed a well-adapted restoration with normal surrounding bone trabeculation

Figure 7. Post-treatment periapical radiograph of #44 revealed a well-adapted restoration with normal surrounding bone trabeculation.

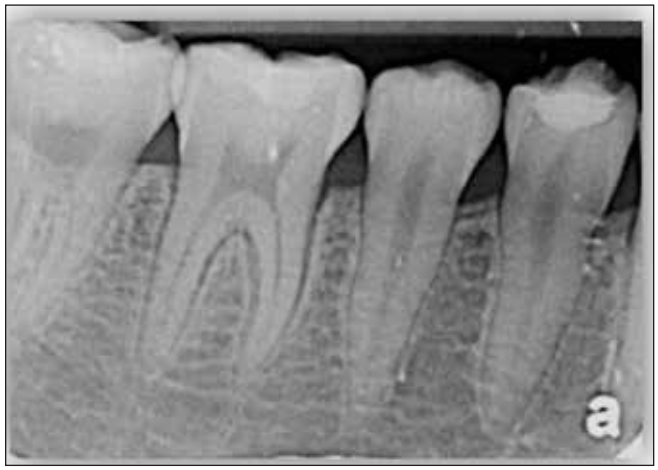


Figure 8. (a and b); 8.a: One year follow up photo of #35. 8.b: One year follow up photo of #44. Restorations were intact with no discoloration or any signs of marginal leakage.

Figure 9. One year follow up periapical readiograph of #35 showed normal periodontal ligament space, surrounding bone trabeculation and periapical area.

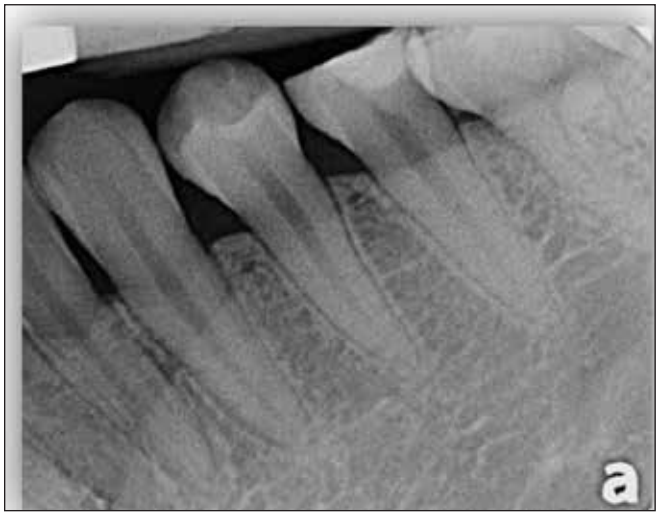


Figure 10. One year follow up periapical readiograph of #44 showed normal periodontal ligament space, surrounding bone trabeculation and periapical area.

DISCUSSION

This case report aimed to highlight the importance of early detection and diagnosis of pre-eruptive intra-coronal resorption and the proper radiographic examination for all erupted and unerupted teeth, even when clinical examination shows intact teeth structure.

In the current case, the patient did not complain from any sensitivity and denied any pain. No pre-eruptive radiographs were found to confirm that teeth had these lesions previously in the pre-eruptive stage.

Upon clinical examination, the affected teeth showed intact occlusal surfaces and healthy enamel with no visible point of entry for caries. However, radiographic examination revealed carious-like lesions extending half way through the dentin with the presence of normal periapical tissue.

The affected teeth were fully erupted and hence the decision was made to treat the lesions with indirect pulp capping followed by permanent restorations. The patient was offered a one year follow up after that to assure the absence of any signs or symptoms of dental disease. Then, he was referred to the general dentistry department for further restorative treatment, as well as future recall and maintenance appointments.

CONCLUSIONS

1. Detailed radiographic examination for erupted and unerupted teeth should be accomplished. Special attention should be placed on coronal areas of unerupted teeth to avoid missing lesions.
2. Hidden caries could be previously present in the same subject prior to teeth eruption as pre-eruptive intra-coronal resorption.
3. Ectopically erupting teeth usually have higher risk of developing pre-eruptive intra-coronal resorption.
4. Multiple lesions may be found within the same individual.

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