PROTOCOL

Management of occult caries induced large periapical lesion

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Abstract

Hidden caries is a term used to describe occlusal dentine caries that is missed on a visual examination, but is a large and demineralized area enough to be detected by another examination using radiographs. This article reports a case of large dentine caries, which presented as to be a small pit-and-fissure carious lesion on the occlusal surface of the left mandibular permanent first molar in an 11-year-old boy leading to large periapical lesion. The treatment included management of large periapical lesion using triple antibiotic paste, root canal treatment, and sealing of the cavity with Glass Ionomer cement followed by stainless steel crown.

Keywords: Occult caries, pre-eruptive carious lesions, primary teeth, radiographs

Introduction

The incidence of caries involving occlusal aspects has been increased in children almost making 80% of new lesions.[1] However, the proper diagnosis of these carious lesions is very difficult as they exhibit different complex occlusal anatomy. The term “hidden caries” was coined to describe the dentine lesions, apparently “hidden” from visual examination but visible on a radiograph.[2] Other terms used to describe this phenomenon include “covert caries,”[3] fluoride syndrome,[4,5] and “occult caries.”[6,7]

Occult caries are found in pit or fissure lesions that develop through tiny enamel defects, progressing under seemingly intact tooth structure. The etiology of hidden caries is still unknown. Although it is suggested that fluoride may play a role in the etiology of “hidden caries,” the scientific validity of this hypothesis is difficult to test because in most European countries over 90% of the population use fluoridated toothpastes.[4] Hashizume et al.[9] study showed that fluoride is not an etiological agent for an increase of hidden occlusal caries. Here we present a case showing the management of occult caries affecting the left mandibular permanent first molar in an 11-year-old male patient.

Case Report

A male patient aged 11 years reported to the Department of Pedodontic and Preventive Dentistry, Davangere, with the chief complaint of decayed teeth in lower left back region of the jaw. His medical history and past dental history were noncontributory with no adverse habits. Patient was well built and nourished with normal vital signs. On intraoral examination, there was a large wide cavity involving dentin along with pre-shedding mobility of teeth 75 and there was fissural staining along with demineralization in the occlusal surface was observed in left mandibular permanent first molar 36 [Figure 1]. On radiographic examination, the tooth 75 showed physiologic root resorption along with large carious lesion involving enamel and dentin. The occlusal surface of tooth 36 was ostensibly intact, asymptomatic and no past history of pain, but radiographically there was a large radiolucency involving coronal dentin wrt 36 which was approaching toward pulp and also there was large periapical radiolucency associated with the same tooth [Figure 2]. With clinical and radiographic evaluation, the case was diagnosed as occult caries wrt 36.

The treatment for tooth 75 was planned as extraction whereas for 36 it was planned to perform the endodontic
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The carious lesion for 36 was accessed with the help of round bur in high speed with water irrigation. When access cavity was prepared, the teeth seem to be non-vital which contained necrotic tissue. Dentine caries removal was completed by hand and rotary instruments and the necrotic pulp tissue was extirpated and removed with endodontic files after obtaining working length determination [Figure 3a] followed by closed dressing was given with 3 mix medicament. In the second appointment, the master cone selection was done and then the root canals were cleaned, dried, and obturated with gutta-percha [Figure 3b and c]. The coronal cavity was restored with glass ionomer cement and in second appointment stainless steel crown was placed for the same. A follow-up after 3 months were made during which the patient was asymptomatic and radiographic examination showed a reduction in periapical radiolucency [Figure 4].

**Discussion**

Based on the guidelines of the National Institutes of Health, Consensus Development Conference Statement 2001, dental caries can be defined as “an infectious, communicable disease resulting in the destruction of tooth structure by acid-forming bacteria found in dental plaque, an intraoral biofilm, in the presence of sugar.” Occult caries is a type of dentin caries, not to be seen on clinical examination of the occlusal surface of the tooth, but can be diagnosed following radiographic examination.

The spread of infection starts from two locations. The first location is from the entrance of pit or fissures which are easily stickable with the dietary foods. The second point is from the walls of the fissure at its bottom which is not visible on direct view. From these two areas, the cariogenic food reaches the bacteria present in these areas and nourishes them thereby further spreading the process of cariogenic activity.

De Soet et al., in his study compared the microflora within the dentine of clinically detectable dentine lesions and clinically...
undetectable or “hidden dentine lesions.” They found that the composition of the bacterial microflora associated with “hidden caries” was different from that of clinically detectable lesions. The flora associated with “hidden caries” was found to be relatively simple with mutants streptococci and lactobacilli nearly always being present. When mutants streptococci were found they were *Streptococcus mutans* and *Streptococcus sobrinus*. In comparison, the microflora recovered from clinically detectable lesions were more complex with additional bacteria present. These bacteria, not found in “hidden caries,” were mainly bacterial species resembling normal dental plaque bacteria.[13]

A popular belief has been that occult caries have resulted from the widespread use of fluoride. Many occult lesions were termed “fluoride bombs” or “fluoride syndrome.”[6-7] This theory hypothesizes that fluoride helps in remineralization and decreases the progress of the caries in the pit and fissure areas of enamel, but the cavitation continues in the dentin part with the intact enamel surface at the top of the carious lesion.[4,5,14-16] One study stated that occult caries is found to be with very low caries scores because of increased fluoride exposure.[2] However, there is a contradictory statement about fluoride and occult caries in a study done in Nederland, which compared the prevalence of occult caries. The study observed 31% decreases in the prevalence of occult caries in the fluoridated city. This was found in contrast to the hypothesis of “fluoride bomb,” suggesting that fluoride has a minimal role in the pathogenesis of occult caries. [17]

In our case, the mandibular permanent first molar was affected by occult caries leading to a large periapical lesion. This finding was in agreement with De Jean, who stated that this tooth is the most common tooth affected hidden caries. The reasons could be that this is the first tooth which is most commonly affected by hidden caries, and shows in the case reported, the tooth affected was mandibular permanent first molar that according to De Jean is the first tooth to erupt in the oral cavity and exhibits different pits and fissures.[14]

Proper diagnosis of occult caries is very important to provide earliest treatment. Use of bitewing radiographs aids in the accurate diagnosis of hidden caries and should be done in all patients. However, an initial or incipient lesion may not be visible radiographically. Because 40-60% of tooth decalcification is essential to produce the radiographic image of the carious lesion. When occult caries is present, it appears as a radiolucent area because of the low attenuation of radiation in the demineralized zone.[21] Other aids to diagnose occlusal caries includes diagnostig fiber optic transillumination, laser luminescence, light scattering, electrical resistance measurements, and dye uptake.[19-21]

Along with occult caries, there is one more entity named pre-eruptive intracoronal resorptive lesions. In few cases of occult caries, it was seen that when previous radiographs of affected tooth during their uneruptive stages were examined, they showed that the radiolucency was already present in some locations within the teeth even prior to their eruption.[17,22-24] These findings suggest that a percentage of occult caries may have their origin as detectable only with the use of radiographs and these are found within the dentin adjacent to an amelodentinal junction in the occlusal aspect of the crown. As the lesion resembles caries, they are referred to as “pre-eruptive caries.”[17,22-24]

To date, clinical and histological evidence substantiates the hypothesis that these defects are acquired as a result of coronal resorption and they contain soft tissue when examined under surgical exposure. Histological examination reveals signs of resorption, such as scalloping of the lesion margins, as well as resorptive cells, are thought to enter dentin through poorly coalesced enamel fissure or cementoenamel junction. Although trigger factors for resorption are unknown, a high association of ectopic positioning of the affected teeth was reported in controlled studies, which suggests that abnormal local pressure may be inciting factor for resorption.[17,22-24] Although the intracoronal resorptive lesion is unlikely to contain microorganisms in pre-eruptive stages, once it is erupted in the oral cavity it becomes rapidly colonized by oral microflora.[17,22-24]

To conclude, occult caries refers to the lesion, which result from inadequate clinical diagnosis and could have resulted from the processes, which were pre-eruptive or post-eruptive. Therefore, providing early and accurate diagnosis of occlusal caries enables best management. As radiographs are probably the most effective method of diagnosing all occult lesions, they should be recommended at appropriate ages to aid early detection of these lesions. Furthermore, radiographic examination of the unerupted crowns for intracoronal defects is recommended on a routine basis.

**References**

13. de Soet JF, Weerheijm KL, van Amerongen WE, de Graaff J. A comparison of the microbial flora in carious dentine of