Management of dens evaginatus: a case report

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ABSTRACT  This article reports the endodontic management of an abscessed premolar due to fractured dens evaginatus. Although the success rate of apexification of teeth with open apices is high, prophylactic treatment of dens evaginatus may help preserve the vitality and strength of a sound tooth, and should be recommended for all patients with this anomaly.

Introduction

Dens evaginatus is a developmental anomaly that can be defined as a tubercle projecting from the surface of an affected tooth and is found most frequently in premolars 1. Its essential feature is an enamel-covered tubercle that projects from the occlusal surface of an otherwise normal premolar. The condition has also been referred to as Leong’s premolars, tuberculated premolars, and evaginated odontome 2,3. It is rare in Caucasian populations, but not in people of Mongoloid origin. A prevalence of 3% to 4.8% has been reported in 12-year-old Hong Kong Chinese children 4,5. It is more common in mandibular premolars than maxillary premolars (more than twice as many), and about 50% of cases have bilateral involvement of collateral teeth 4. Five variants of pulp horns in dens evaginatus have been identified 6: wide, narrow, constricted pulpally, isolated, and absent.

Dens evaginatus is clinically important as fracture or wear of the tubercle can lead to pulp death and periapical abscess, often before completion of root formation 2,3. This occurs as a result of direct exposure of the pulp extensions in the tubercle to bacteria or, when no direct exposure has occurred, bacterial invasion of the pulp via patent dentinal tubules 6. This article reports the endodontic management of an abscessed premolar with fractured dens evaginatus.

Case report

A 10-year-old Chinese girl complained of a dental abscess in the mandibular left quadrant. Her dental and medical history was unremarkable. Oral examination revealed permanent dentition and an abscess, buccal to the mandibular left second premolar. A fractured dens evaginatus was seen at the occlusal surface of the premolar and the tooth did not respond to an ethyl chloride test. A periapical radiograph demonstrated a periapical lesion of the mandibular left second premolar (Figure 1). Root formation of the tooth was incomplete. This premolar was the only tooth affected by dens evaginatus. The tooth was isolated under rubber dam and the necrotic pulp removed through an occlusal access cavity. The canal was cleaned using hand files and sodium hypochlorite solution (1:9 dilution of household bleach), and dried with sterile paper points. Non-setting calcium hydroxide paste made from pure calcium hydroxide powder and
distilled water was applied as a root dressing to induce apexification. The access cavity was filled with zinc oxide eugenol cement (IRM; Caulk/Dentsply, Milford, United States). The patient was reviewed and the calcium hydroxide dressing changed every 3 months. Calcific closure of the root apex was seen 9 months after the first root dressing. The root canal was obturated with gutta-percha and sealer (AH26; DeTrey/Dentsply, Konstanz, Germany) at 12 months and the access cavity restored with dental amalgam (Lojic; SDI, Victoria, Australia) [Figure 2].

Discussion

The exact mechanism of the formation of dens evaginatus is unknown. It has been postulated that the anomaly is caused by an evagination of the internal enamel epithelium and dental papilla into the stellate reticulum during the morpho-differentiation stage of tooth development. The racial difference in prevalence and the higher incidence among first-degree relatives of affected individuals compared with the general population suggest a significant genetic component in the etiology. An early study revealed that 18% of premolars with dens evaginatus were associated with periapical lesions and all these teeth showed either worn or fractured tubercles. It was suggested that exposure of the patent dentinal tubules with or without pulpal exposure provided an opening for bacterial invasion.

The treatment for this patient consisted of apexification with calcium hydroxide paste, a technique that has been successfully used for treatment of infected permanent teeth with immature roots. The dressing, which should be changed every 3 to 6 months, is bactericidal and creates an environment conducive to the production of mineralized tissue in the apical region. A disadvantage of this technique is the requirement for multiple dental visits and the consequent long treatment duration. Induction of apexification using mineral trioxide aggregate is a newer option that requires less time. Long-term studies are needed to prove its consistent success over a large group of teeth.

Fracture or wear of the tubercle in teeth with dens evaginatus may lead to pulp necrosis before completion of root formation. The thin radicular dentine makes the endodontically treated tooth weaker than a normal sound premolar. Various prophylactic treatments have been proposed to treat these teeth before pulp infection.
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occurs: selective grinding of the tubercles, application of resin to reinforce the tubercles (Figure 3), placement of prophylactic amalgam or composite restorations after removal of the tubercles and cavity preparations (Figure 4), or cavity preparations followed by partial pulpotomy. An evaluation of the effectiveness of selective grinding of the tubercles in 22 teeth revealed the treatment to be unreliable: only six teeth showed secondary dentine formation. In contrast, prophylactic treatment of dens evaginatus with either amalgam or resin restorations has shown a high success rate. Reinforcing the tubercle by placing composite resin around it is a possible option although it is limited to small tubercles with no occlusal interference. More recently, partial pulpotomy with mineral trioxide aggregate has been proven to offer successful prophylaxis for these teeth. Extraction of teeth with dens evaginatus should be considered in cases where orthodontic extractions are needed.

In summary, pulpal infection associated with fractured dens evaginatus is not uncommon, and often occurs before root formation is complete. Prophylactic treatment of dens evaginatus by placing either composite build-up or conservative restorations is effective and should be recommended to all patients with this anomaly.

References


Figure 4  Occlusal views of tooth 25: (a) before and (b) after placement of a preventive resin restoration at the fractured tubercle.