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Dental abscess in a tooth with intact dens evaginatus

S. Y. CHO
School Dental Care Service, Department of Health, Hong Kong

Summary. This article reports a case of dental abscess in a mandibular premolar with intact dens evaginatus. Dentists are advised to critically evaluate those teeth with dens evaginatus, both clinically and radiographically, before attempting prophylactic treatments. This is particularly important medicolegally in case the tooth develops symptoms shortly after the prophylactic treatment. Dentists practising in Western countries should also be aware of this dental anomaly because of the increasing global migration of people from Asia.

Introduction

Dens evaginatus is a developmental anomaly that can be defined as a tubercle from the surface of an affected tooth and is found most frequently in premolars [1,2]. The occurrence of dens evaginatus seems to show great racial variation, with a higher prevalence in people of Mongoloid origin. Reichart & Tantiniran reported a rate of 1% in Thai [3] and Curzon *et al*. reported a rate of 3% in Keewatin Eskimos [4]. Yip examined 1084, 9–13-year-old Chinese, Malay and Indian children in Singapore, and found that the Chinese were more frequently affected (3·6%) than Malay children (1·1%) [5]. The anomaly was not observed in any Indian children in the above study. Bedi & Pitts also found that 3% of 12-year-old Hong Kong Chinese children had teeth with dens evaginatus [6]. These authors commented that the variation seen among these subpopulation groups may be a result of differences in genetic make-up as well as because of differences in survey methodology, such as different age groups being examined. Although dens evaginatus is seen more commonly in people of Mongoloid origin, dentists practising in Western countries should also be aware of this anomaly because of the increasing global migration of people from Asia.

Dens evaginatus is clinically important because fracture or wear of the tubercle could lead to pulp necrosis and periapical abscess, often before completion of root formation [7–12]. These would occur either as a result of direct exposure of the pulp extensions in the tubercle or, when no direct exposure has occurred, the pulp may succumb through bacterial invasions via patent dentinal tubules [13–15]. This article reports a case of dental abscess in a premolar with apparently intact dens evaginatus.

Correspondence: Shiu-yin Cho, Fanling School Dental Clinic, 2/F Fanling Health Centre, 2 Pik Fung Road, Fanling, N.T., Hong Kong. E-mail: rony_cho@dh.gov.hk

Case report

KY was a 9-year-old Chinese girl who complained of a dental abscess at the mandibular left quadrant. Her dental and medical history was unremarkable. On examination, KY was in mixed dentition with left primary second molars, right primary first and second molars, and maxillary primary canines retained. An abscess was seen between the mandibular left permanent canine and first premolar (Fig. 1). A pearl-shaped tubercle was seen on the occlusal surface of the mandibular left permanent first premolar with no obvious sign of wear or fracture (Fig. 2). The first premolar did not respond to cold test and a periapical radiograph with a gutta-percha point inserted through the abscess was taken. The radiograph showed a periapical lesion of the mandibular left first premolar (Fig. 3). The necrotic pulp of the first premolar was then removed through an occlusal access cavity, and the canal was shaped and cleaned and then irrigated with sodium hypochlorite solution. Non-setting calcium hydroxide paste was used as root dressing and the access cavity was filled with zinc oxide eugenol cement. The patient was reviewed, and the calcium hydroxide dressing changed monthly and then every 3 months. The abscess subsided after the second root dressing, and completed root growth

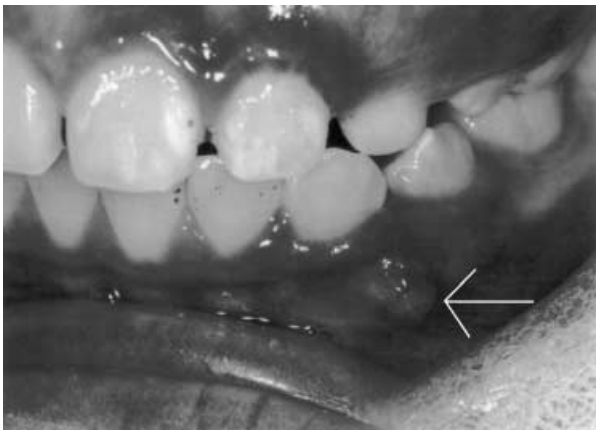

Fig. 1. Buccal view of the dentition showing a dental abscess between teeth 33 and 34.

Fig. 2. Occlusal view of tooth 34 showing the intact dens evaginatus.

Fig. 3. Preoperative radiograph of tooth 34 showing a periapical lesion.

Fig. 4. Radiograph of tooth 34 taken 18 months after the first root dressing showing complete healing of the periapical lesion. Completed root growth and calcific closure of the tooth apex was also seen.

and calcific closure of the tooth apex was seen 18 months after the first root dressing (Fig. 4). The root canal was obturated with gutta-purcha at 24 months and the access cavity was restored with dental amalgam.

Discussion

The exact mechanism for the formation of the dens evaginatus is not known. It is thought to form from the evagination of an area of the inner enamel epithelium and its subjacent odontogenic mesenchyme into the dental organ during early tooth development [2]. Oehlers *et al*. have identified five variants of pulp horns in dens evaginatus, which are: wide, narrow, constricted pulpally, isolated or absence [13]. Histologically, the pulp horn could be seen up to 3·2 mm in length [13].

Early studies have shown that over 75% of the tubercles were eventually fractured or worn [1,5]. Reichart & Tantiniran have shown that 27% of the premolars with dens evaginatus had periapical abscesses [3]. The rest of the anomalous premolars in their study were found to have intact or slightly worn tubercles, and have no periapical pathosis. In another study, Goto *et al*. found that 18% of the anomalous premolars were associated with periapical lesions, and all these teeth showed either worn or fractured tubercles [1]. It was suggested that exposure of the patent dentinal tubules with or

without pulpal exposure opened a pathway for bacterial invasion [13–15]. Pulp necrosis associated with apparently intact tubercle in dens evaginatus, as seen in this case, was uncommon. It was suspected that there may be microscopic defects in the enamel covering the tubercle, which allowed bacterial invasion into the dental pulp. Other possible pathogenic mechanisms also included trauma and bacterial invasion via periodontal defect [11]. However, there had not been any history of trauma and neither was there periodontal lesion in the affected tooth in this case.

The treatment carried out in this case is apexification with calcium hydroxide paste. This treatment has been proved to be successful for the treatment of infected permanent teeth with immature roots [16]. Since fracture or wear of the tubercle in teeth with dens evaginatus could lead to pulp necrosis before completion of root formation, various prophylactic treatments have been proposed to treat these teeth before infection of the pulps occur. These include selective grinding of the tubercles [13], application of resin to reinforce the tubercles [17–19], placement of prophylactic restorations [20–23], or even performing partial pulpotomy in teeth with dens evaginatus [18,24]. Oehler *et al*. evaluated the effectiveness of selective grinding of the tubercle and concluded that this was an unreliable treatment [13]. Yong successfully treated 39 asymptomatic and vital teeth by removing the tubercles, and placing either direct or indirect pulp cap followed by amalgam restorations [20]. Lim *et al*. also found this treatment successful in all 121 teeth in their study [23]. Sim compared treatment of dens evaginatus with either prophylactic amalgam or resin restorations, and found a higher success rate with the latter treatment [22]. However, pre- and postoperative radiographs were not taken in his study. More recently, successful prophylactic treatment by performing partial pulpotomy with mineral trioxide aggregate in these teeth has also been reported [25]. Reinforcing the tubercle by placing composite resin around it is a possible option, but would be limited to small tubercles where occlusal interference would not be induced after the build-up [21]. Extraction should be considered in cases where orthodontic extractions are needed [10].

In summary, pulpal infection associated with an intact dens evaginatus is uncommon. Microscopic defects may be present at or around the tubercle which allow bacterial invasions without obvious exposure of dentine or pulp. Because the dental pulps may become nonvital before symptoms arise, dentists are advised to critically evaluate all teeth with dens evaginatus clinically and radiographically before attempting prophylactic treatments. This is particularly important medicolegally in case the tooth develops symptoms shortly after the prophylactic treatment.

What this paper adds

- Dental pulps of teeth with dens evaginatus could become necrotic even before the tubercles are fractured or worn.

Why this paper is important for paediatric dentists

- Dental abscess associated with dens evaginatus is seen more often in adolescents and teenagers than in older patients.
- Careful pre-operative assessment of all teeth with dens evaginatus, even when the tubercles are intact, is important.

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