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Case Report

Dens evaginatus: a cause of periapical pathology in caries-free teeth

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ABSTRACT

There are morphological variations reported in both primary and permanent dentition. This case report describes the presentation of dens evaginatus causing periapical pathology in a caries-free mandibular second premolar. The tubercle-like presentation of dens evaginatus interferes with the occlusion of posterior teeth. Occlusal wear caused exposure of the pulp within the cusp resulting in pulpal necrosis and, eventually, periapical pathology. Proper diagnosis and management by root canal treatment resulted in the resolution of the symptoms and complete healing.

Keywords: Dens evaginatus, Pulp necrosis, Case report, Morphological variation

INTRODUCTION

Dens evaginatus (DE) is a developmental anomaly characterized by the presence of an accessory cusp or tubercle projecting above the tooth surface of posterior teeth. It usually consists of an enamel covering over a dentinal core, with around 70% of these tubercles containing pulp tissue.[1] The common locations where this can occur are the occlusal surface of mandibular premolars.[2,3] Other terms used to describe dens evaginatus are occlusal tubercle, occlusal pearl, and Leong's premolar. A dens evaginatus may also develop on the palatal surface of an anterior tooth and is referred to as Talon's cusp since it resembles an eagle's talon.[4]

The presence of dens evaginatus may interfere with occlusion and masticatory forces may cause the tubercle to fracture or wear away, causing exposure of the pulp within the tubercle leading to necrosis of the pulp and periapical infection.[5] Therefore, treatment modalities are determined by the status of the pulp and can range from preventive treatment to pulp therapy and root canal treatment.[6] Early detection and management are beneficial to avoid such complications and advanced treatment.

Dens evaginatus mainly occurs among Asians, with an incidence of 0.5 to 4.3%.[1] Its prevalence is most commonly in people of Asian descent, including Filipinos, Indians of North America, Eskimos, Chinese, Thais, and Japanese.[7] There is a higher prevalence of 4.3% reported in people of Mongloid origin and 2.4% among the Indian population.[6,8] However, there is no reported case from the Middle East region so far.

The purpose of this case report was to discuss the diagnosis and treatment of a mandibular second premolar having pulp pathology due to dens evaginatus, treated in Dubai, United Arab Emirates.

CASE REPORT

An 18 year old boy reported to the dental clinic of Dubai health authority with swelling on the lower right side of his face. The medical and family history was noncontributory. Clinical examination revealed 24 permanent teeth, with no carious lesions on the premolars or molars. However, there was a firm swelling in the right side buccal sulcus adjacent to the right side mandibular second premolar (#29).

Tooth #29 was tender to percussion and did not respond to thermal or electric pulp tests, while the adjacent teeth gave a normal response. A closer and more careful examination revealed a slight projection from the middle

of the occlusal surface of the tooth with a dark spot in the middle (Figure 1).

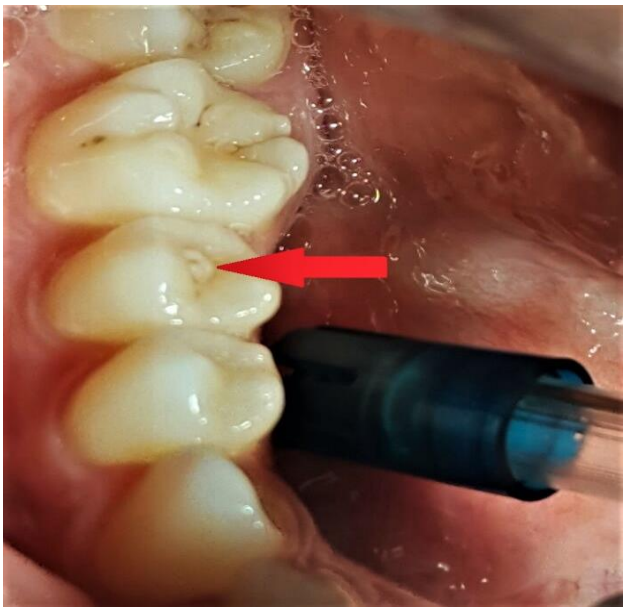

Figure 1: Clinical presentation with tubercle projection from the middle of the occlusal surface of tooth 29.

Figure 2: Radiograph revealing periapical radiolucency around tooth 29.

Figure 3: Immediate radiograph after obturation of tooth 29.

Figure 4: 2-month follow-up radiograph.

Figure 5: 6-month follow-up radiograph.

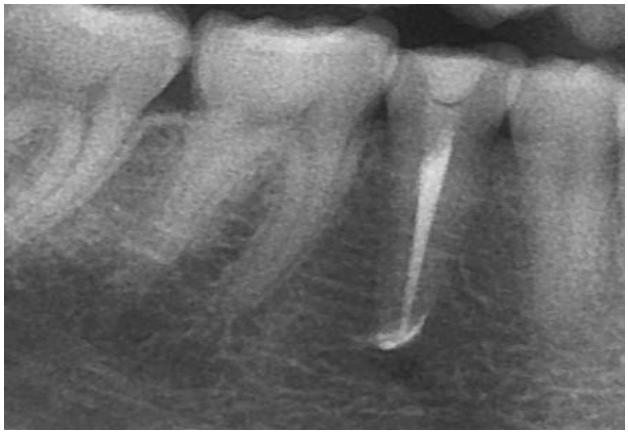

Figure 6: 2-year follow-up radiograph.

The periapical radiograph revealed a circumscribed radiolucency around the apex of #29 (Figure 2). There were no findings indicative of dental caries or previous restorations. However, a thin radiolucent line was seen extending upwards to the occlusal surface at the location of the projection. The clinical and radiographic findings all pointed towards the possibility of dens evaginatus. We arrived at a diagnosis of pulpal necrosis causing a dental abscess for tooth #29. The diagnosis was confirmed by performing a test cavity into the pulp chamber without

anesthesia, revealing necrotic pulp tissue. After obtaining informed consent, endodontic treatment of #29 was completed over three sessions using Calcipast (CERKAMED Medical Company, Poland) as an intra-canal medication. Instrumentation was done using Protaper Next rotary files (Dentsply, Maillefer, Ballaigues, Switzerland) and enlarging to a size X3 at the apex with sodium hypochlorite and saline as irrigants. The canal was dried with paper points and obturated by lateral condensation with Gutta-percha using Sealapex (Kerr Corporation, USA) as a sealer (Figure 3)

The symptoms resolved and the patient was followed up for two years. The 2-month, 6-month, and 2-year follow-up radiographs show complete resolution of the periapical lesion (Figure 4-6).

Table 1: Six categories to determine treatment of teeth with dens evaginatus.

Categories		Treatment
Type I	Normal pulp, mature apex	Reduce opposing occluding tooth Apply acid-etched flowable light-cured resin to the tubercle Yearly re-evaluation to assess occlusion, resin, pulp, and periapex When re-evaluation demonstrates adequate pulp recession, remove tubercle and apply resin
Type II	Normal pulp, immature apex	Same as type I except re-evaluation every 3-4 months until the development of mature apex
Type III	Inflamed pulp, mature apex	Conventional root canal treatment followed by restoration
Type IV	Inflamed pulp, immature apex	Shallow mineral trioxide aggregate pulpotomy, glass ionomer cement layer, and etched light-cured resin
Type V	Necrotic pulp, mature apex	Conventional root canal treatment followed by restoration
Type VI	Necrotic pulp, immature apex	Mineral trioxide aggregate root end barrier, glass ionomer cement layer, and etched light-cured resin

DISCUSSION

Oehler proposed the theory behind the development of DE as an abnormal proliferation with the folding of a portion of the inner enamel epithelium and adjacent ectomesenchymal cells of the dental papilla into the stellate reticulum of the enamel organ during the bell stage of the tooth formation.[1]

Awareness of dens evaginatus and its progression is essential in diagnosing and promptly treating this anomaly. The tubercle often contains pulp tissue, and the fracture or wear can eventually lead to pulp exposure and necrosis. DE may also be present on a tooth, along with other developmental disorders like dental fusion.[9] Schulge proposed five types of presentation of DE for posterior teeth based on the location of the tubercle.[10] The clinical presentation, in this case, conforms to type 5.

Type 1: A cone-like enlargement of the lingual cusp.

Type 2: A tubercle on the inclined plane of the lingual cusp.

Type 3: A cone-like enlargement of the buccal cusp.

Type 4: A tubercle on the inclined plane of the buccal cusp.

Type 5: A tubercle arising from the occlusal surface obliterating the central groove.

Levitan et al proposed six categories to develop a treatment plan based on the pulp vitality and root formation status summarized in Table 1.[6] Prevention of pulpal involvement in cases of DE is preferred over more invasive techniques. Current therapy for teeth with normal pulp and completed root formation includes applying topical fluoride and placing a flowable light-cured resin on and around the tubercles to prevent fracture and pulpal involvement.[6]

In a tooth with vital pulp, selective reduction of the opposing occluding tooth will preserve the vitality of the tooth. In cases where the tubercle has fractured, prompt sealing with a resin restoration is recommended to prevent pulp exposure.[11] This approach is essential to avoid the need for treatment of teeth with immature apices and thin, weak roots.[12,13] It had been reported that 1.1% of DE-affected teeth eventually develop dental complications.[14] However, the patient rarely presents with symptoms until the pulp is involved, so early diagnosis is often missed. Our case was similar, where the patient's first presentation to our clinic was after the pathology had set in. Our case presented as a type 5 tubercle with necrotic pulp and a mature apex. Therefore, according to the treatment plan proposed by Levitan et al conventional root canal therapy was performed. The prompt diagnosis and treatment resulted in the resolution of the symptoms within a short period. The case was followed up for two years until complete healing was established.

CONCLUSION

The occurrence of dens evaginatus may be considered in cases where there is pulp pathology without any caries or other significant causes. Appropriate early diagnosis can

prevent serious complications that can develop with this anomaly. If anomalies or complications arise, prompt diagnosis and knowledge of treatment options will result in complete resolution and healing.

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