CASE REPORT

Concurrent Occurrence of Developmental Anomalies—Dens Evaginatus and Dens Invaginatus in Maxillary Lateral Incisor: Report of Two Cases

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ABSTRACT

Developmental anomalies affecting tooth morphology are common in the literature. Dens evaginatus (DE) occurring in anterior tooth, termed 'talon cusp' is a relatively rare developmental anomaly. It presents as an additional cusp that project predominantly from the lingual surface of primary or permanent anterior teeth. Dens invaginatus (DI) is a developmental anomaly resulting from infolding of the tooth crown or root before calcification has occurred. Concurrent occurrence of DE and DI within the same tooth is rare. The present article reports two cases with concurrent occurrence of DE and DI in permanent maxillary lateral incisor. In case 1 the DE and DI are associated with nonvital tooth and in case 2 the DE and DI are associated with a vital tooth. The management aspects are discussed.

Key messages: The present article demonstrates successful management of two cases with concurrent occurrence of developmental anomalies dens evaginatus and dens invaginatus. Case 1 with necrotic pulp required endodontic therapy, while the vital tooth in case 2 was treated by prophylactic placement of fissure sealant. Early detection of such anomalies may allow early intervention and better prognosis.

Keywords: Concurrent occurrence, Dens evaginatus, Talon cusp, Dens invaginatus.

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INTRODUCTION

Dens evaginatus (DE) or talons cusp (in anterior teeth) is characterized by the presence of an accessory cusp-like structure projecting from labial surface[1] or cingulum area or cementoenamel junction (CEJ) of lingual surface of maxillary or mandibular anterior teeth in both the primary and permanent dentition.[2] The etiopathogenesis of DE is multifactorial, and is thought to be polygenetic with some environmental influences. Prevalence of DE in anterior teeth varies from 0.06 to 7.7%.[3] Based on the degree of their formation and extension, Hattab et al[4] have classified this anomaly into three types:

- *Type I (Talon)*: An additional cusp that projects from the palatal surface of anterior tooth and extends at least half the distance from the CEJ to the incisal edge.
- *Type II (Semitalon)*: An additional cusp of a millimeter or more but extending less than half the distance from the CEJ to the incisal edge.
- *Type III (Trace talon)*: Enlarged or prominent cingula and their variations, i.e. conical, bifid or tubercle-like.

Histologically, it is composed of normal enamel and dentin and it may or may not contain pulpal tissue.[2] Clinically DE can pose esthetic and functional problems to the patient.[4]

Dens invaginatus (DI) is a developmental anomaly due to a deepening or invagination of the enamel organ into the dental papilla prior to calcification of the dental tissues.[5] Factors responsible for DI are controversial. However, few proposed factors include, distortion of the enamel organ during tooth development, rapid and aggressive proliferation of part of internal enamel epithelium invading the dental papilla and focal failure of growth of internal enamel epithelium.[5] Oehlers categorized invaginations into three classes depending on their extent radiographically from crown into the root:[6]

- *Type I*: Minor form occurring within the confines of the crown not extending beyond the level of the external CEJ.
- *Type II*: Invagination extends apically beyond the CEJ and may or may not communicate with the pulp.
- *Type III*: Invagination extends through the root and communicates laterally (type IIIA) or apically (type IIIB) with periodontal ligament. There is usually no communication with the pulp.

While the morphology of the lingual surface of the tooth might suggest a groove or fissure, the diagnosis is made based on radiographic evidence.[3] The reported prevalence of adult teeth affected with DI is between 0.3 and 10%.[7]

Although both DE and DI individually have been reported extensively in literature, concurrent occurrence of DE and DI within the same tooth is a rarity and few cases have been reported.[3,8,9]

This report describes two cases of concurrent occurrence of DE and DI in maxillary lateral incisor. Case 1 with DE (type II) and DI (type I) in a immature maxillary lateral incisor with necrotic pulp and large periapical lesion and, case 2 with DE (type I) and DI (type I) in a vital maxillary lateral incisor.

CASE REPORTS

Case 1

A 16-year-old male patient was reported with a complaint of pain and swelling in upper front tooth region and roof of mouth since 3 months. Patient gave a history of fall 2 years back and medical history was noncontributory. An intraoral examination revealed good oral hygiene and a moderate swelling on palate (Fig. 1). A draining sinus was present on labial vestibule of maxillary right lateral incisor. The tooth was tender to percussion and gave negative response to vitality tests. The palatal surface exhibited a cusp-like projection extending from the CEJ to less than halfway to the incisal edge and a deep pit coronal to the cingulum was felt on probing (Fig. 1). The accessory cusp did not interfere with esthetics or functional impairment. The adjacent teeth (No. 15,14,13,11,21 and 22) responded within normal limits for percussion, palpation and vitality tests. A periapical radiograph revealed a V-shaped radiopacity (DE), a radiolucency surrounded by a radiopaque border (DI) in the coronal part of the tooth; incomplete apex formation and a large periapical radiolucency (Fig. 2). Contralateral tooth (No. 22) was normal clinically and radiographically.

The clinical and radiographic findings suggested the diagnosis of DE (type II) and DI (Oehlers' type I), pulpal necrosis with immature apex secondary to trauma and infected radicualr cyst.

The DE and DI were removed incidental to the access cavity preparation, and intracanal calcium hydroxide was placed to initiate apexification process. Intracanal calcium hydroxide was repeated every 2 months and a 6-month recall radiograph suggested healing in periapical area. Access cavity restoration was removed and the formation of apical barrier was confirmed with a large size k-file. Subsequently the tooth was obturated with gutta-percha using roll cone technique. On a 12-month recall the tooth was asymptomatic and periapical radiograph showed osseous repair (Fig. 3).

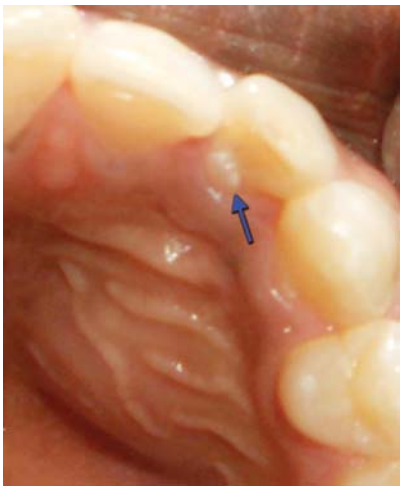

Fig. 1: Case 1: Palatal surface of the maxillary right lateral incisor with dens evaginatus (arrow)

Fig. 2: Case 1: Periapical radiograph showing a DE (arrow), a DI (arrow heads), immature apex and large periapical radiolucency

Fig. 3: Case 1: Periapical radiograph after 1 year recall

Case 2

A 15-year-old male patient reported with a chief complaint of broken upper front teeth since 1 year and desired to get it restored. There was a history of fall 1 year back and the medical history was noncontributory. An intraoral examination revealed moderate oral hygiene with Elli's class III fracture involving maxillary central incisors (No. 11 and 21). The teeth were tender to percussion and gave negative response to vitality tests. The adjacent teeth (No. 13,12,22,23) responded within normal limits for percussion, palpation and vitality test. The palatal surface of left maxillary lateral incisor revealed a well delineated projection extending throughout the length of the crown and a deep lingual pit (Fig. 4) An periapical radiograph revealed a V-shaped radiopacity superimposed on the normal structures of crown, and a keyhole-shaped radiolucency with radiopaque border confined to the coronal part of the tooth

Fig. 4: Case 2: Palatal surface of maxillary left lateral incisor with a well-delineated projection extending throughout the length of the crown and a deep lingual pit (arrow)

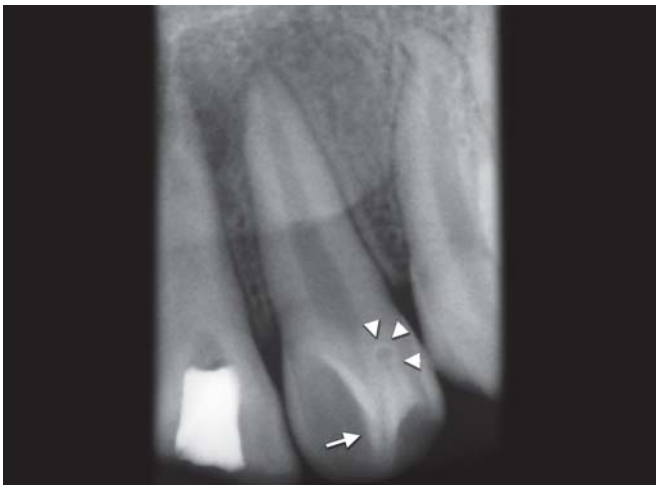

Fig. 5: Case 2: Periapical radiograph showing DE (arrow) and DI (arrowheads)

(Fig. 5). Contralateral tooth was normal clinically and radiographically.

The clinical and radiographic findings suggested the diagnosis of DE (type I) and DI (Oehlers type I) in maxillary left lateral incisor. Since, there was no evidence of caries or pulpal disease, prophylactic acid-etched sealant was used to seal the entrance to the invagination. Also the DE (type I talon cusp) did not interfere with esthetics or functional impairment, hence required no treatment and was kept under observation. However, endodontic treatment was carried on the maxillary central incisors.

DISCUSSION

The problems associated with DE may include compromised esthetics, occlusal interferences, displacement of affected tooth, caries risk, pulpal necrosis, periodontal problems and periapical pathosis.[4] The presence of an DI is considered to increase the risk of caries, pulpal pathosis and periodontal inflammation.[7] Although DE and DI are relatively common anomalies, the combination of both in a single tooth is rare.[3,10]

Early diagnosis and treatment of DE is required to prevent complications. Treatment may differ depending on each case. Small cusps are usually asymptomatic, necessitating no treatment.

In case I, the type II DE had no occlusal or esthetic impairment and it was incorporated into the access cavity preparation. Similarly in case II, the type I DE had no occlusal interference or esthetic impairment. As the occlusion was not fully established, no treatment was advised for the same. However, if any interference were present, the gradual reduction of the DE, followed by topical fluoride application should be carried out to avoid pulpal irritation and induce formation of tertiary dentin.[4]

In management of tooth with type I DI, with no evidence of pulpal disease as in case II, prophylactic treatment like placement of fissure sealants should be carried out and the tooth should be monitored regularly.[5,11] If pulpal disease is present or subsequently develops, root canal treatment can be instigated. Management of invaginated immature teeth with nectroic pulps is complicated by thin root canal walls and open apices associated with these teeth.[11] Since the type I DI is located coronally, to ensure adequate debridement, the DI should be incorporated into the access cavity. This could invariably result in further loss of tooth tissue. However, this loss could be of less significance in type I DI, compared to type II and III DI.

In immature apex, as in case I, MTA is the material of choice to create apical barrier and gutta-percha can be used to backfill the canal. Due to economic reasons and the availability of the patient for frequent visits, a calcium hydroxide apexification procedure was carried out.

CONCLUSION

The practitioner should be aware of concurrent occurrence of DE and DI in a single tooth. Early diagnosis of such developmental anomalies and their types can be treated by prophylactic or minimal intervention resulting in prevention of complications. However, DE and DI with pulpal or periodontal complications necessitate meticulous treatment planning for better diagnosis.

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