Multiple dens invaginatus affecting maxillary lateral incisors and a supernumerary tooth


Abstract — Dens invaginatus is a developmental variation resulting from an alteration in the normal growth pattern of the dental papilla of a tooth. This anomaly occurs predominantly in maxillary permanent lateral incisors. Multiple occurrence in maxillary incisor teeth in the same patient has frequently been reported, and examination of bilateral teeth for the anomaly is often carried out routinely. This paper reports an unusual case of multiple invaginations, including dens invaginatus affecting maxillary lateral incisors and a supernumerary tooth and minor invaginations of the upper canines. Moreover, the case illustrates the importance of examining all the teeth in patients who present with dens invaginatus and palatal pits in incisors and canines. The possibility that the supernumerary tooth had resulted from gemination of the lateral incisor tooth germ is discussed.

Dens invaginatus, also known as dens in dente, dilated composite odontoma or deep foramen caecum, is a developmental anomaly resulting from an invagination in the surface of a tooth crown before calcification has occurred (1). The aetiology of dens invaginatus is still not entirely known. Most probably the invagination has its origin in a deep folding of the foramen caecum during tooth development, which in some cases may even result in a second apical foramen. It may be caused by increased localized external pressure, focal growth retardation or focal growth stimulation in certain areas of the tooth bud (2). The invagination presents a predisposing site for carious lesions, often resulting in early pulp necrosis and apical periodontitis.

This condition was first reported by Salter (3). The invaginations may vary from a slightly accentuated cingulum (foramen caecum) to deep foldings reaching to the apical foramen (4). Several classifications have been proposed and Hallett (5) suggests the existence of four types of invaginations:

Type 1: a definite cleft is found in the palatal enamel at the cervical level; the cleft runs vertically and there is no expansion or dilatation.

Type 2: the invagination extends towards the pulp chamber and a definite pit is formed in the cingulum.

Type 3: the invagination extends deeply into the pulp chamber and is dilated.

Type 4: the invagination occludes the coronal pulp chamber and may extend beyond the cementoenamel junction level.

Oehlers (6) has classified dens invaginatus into three groups:

Type 1: the invagination is confined to the crown of the tooth.

Type 2: the invagination extends apically beyond the cementoenamel junction but remains confined within the root as a blind sac which may communicate with the pulp.

Type 3: the invagination also extends beyond the cementoenamel junction, but has no communication with the pulp. In addition, a periapical or periodontal foramen is present.
Fig. 1. Palatal view of the maxillary left lateral incisor. Note the palatal pit.

Fig. 2. Palatal view of the maxillary right lateral incisor and the supernumerary tooth. Note the palatal pits.

Dens invaginatus can occur in all dentitions with a prevalence ranging from 0.25% to 7.74% (7). It has been reported in the maxillary central and lateral incisors, canines and bicuspids, and the mandibular incisors and bicuspids (8). The maxillary lateral incisors are the teeth most frequently involved in dens invaginatus, sometimes symmetrically, and the occurrence of dens invaginatus in supernumerary teeth is also frequent (4). Dens invaginatus has been found in several members of the same family (9).

This paper reports an unusual case of multiple invaginations, including multiple dens invaginatus affecting maxillary lateral incisors and a supernumerary tooth, and minor invaginations of the upper canines.

Case report

A 52-year-old white man was admitted to our clinic for routine examination. There were no symptoms but a clinical examination revealed the presence of a supernumerary maxillary incisor located between the right lateral incisor and canine. The supernumerary tooth and the right maxillary lateral incisor were slightly smaller than the contralateral lateral incisor. Both lateral incisors and the supernumerary tooth showed a deep invagination of the lingual pit. The supernumerary tooth showed an enamel projection in the middle of its lingual surface (Fig. 1 and Fig. 2). The upper canines also presented with exaggerated cingulum pits, possibly representing minor examples of invaginations.

The teeth responded to thermal stimuli (heated gutta-percha) and electrical pulp testing. All teeth were caries free. However, the teeth exhibited composite restorations in the labial surface. Periodontal probing revealed healthy gingiva (probing depth <1.5 mm). No abnormal mobility was noted, and the crowns did not show discoloration. Periapical radiographs were taken. The radiographic examination revealed bilateral dens invaginatus involving both maxillary lateral incisors and, in addition, dens invaginatus affecting the supernumerary tooth. The upper canines did not show dens invaginatus. No pathosis was evident in the periapical area and no radicular abnormalities were found. A clinical diagnosis of dens invaginatus was established (Hallett type 3 and Oehler type 1 for each) (Fig. 3 and Fig. 4).
Fig. 4. Periapical radiograph showing Oehler's type 1 dens invaginatus in the maxillary right lateral incisor and the supernumerary tooth.

Discussion

Dens invaginatus has been classified by Hallett (5) and Oehler (6). The first three types of dens invaginatus in Hallett's classification refer to crown invaginations. However, all crown invaginations are designated type 1 in Oehler's classification of dens invaginatus. We think, taking into account that crown invaginations are much more common than root invaginations, that Hallett's classification is the most convenient to use.

It was thought that the present three occurrences of dens invaginatus belonged to Hallett's type 3 (5). In this type of invagination “the invagination extends deeply into the pulp chamber and is dilated”. According to Oehler's classification (6) the three occurrences of dens invaginatus belonged to type 1. In this type of dens invaginatus “the invagination is confined to the crown of the tooth”. The invaginations presented in this case penetrated only to the level of the crown and did not communicate with the pulp although communication usually exists between the root canal and the invagination (13).

Many investigators have reported the occurrence of pulpal and periapical pathoses related to dental invaginations, which suggests that apical pathosis from pulpal death is a common occurrence related to caries or defects within the invagination (10–12). The absence of pulpal and periapical pathoses in the three teeth in our patient at the age of 52 years is rare.

The similarity of the right maxillary lateral incisor with the supernumerary tooth and the fact that each of them was slightly smaller than the contralateral upper lateral incisor suggested the possibility (or probability) that the supernumerary tooth had resulted from gemination of the lateral incisor tooth germ. If the hypothesis of genetic pre-determination of tooth shape is correct, the invagination is pre-determined and if the tooth germ undergoes gemination then each separate tooth will have the same developmental anomaly, ie, dens invaginatus in this case. Therefore, we think that the association which the present case suggests is important for future considerations of the aetiology of anomalies of dental development.

References

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