

## CASE REPORT

# Dens invaginatus and dens evaginatus in a single tooth: Report of two cases

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### ABSTRACT

#### Dens invaginatus and dens evaginatus in a single tooth: Report of two cases

Dens invaginatus and dens evaginatus are developmental dental anomalies. The presence of double dens invaginatus and dens evaginatus in the same tooth is extremely rare. This article presents two cases of double dens invaginatus and dens evaginatus in permanent maxillary lateral incisors. Detailed clinical and radiographic examinations are beneficial to determining such abnormality. Clinicians should be aware about radiographic and clinical findings and thus may prevent possible complications of these conditions.

### KEYWORDS

Anomaly, dens evaginatus, dens invaginatus, double, talon cusp

### ÖZ

#### Tek bir dişte dens invaginatus ve dens evaginatus: İki vaka raporu

Dens invaginatus ve dens evaginatus gelişimsel dental anomalilerdir. Aynı dişte çift dens evaginatus ve dens invaginatus son derece nadirdir. Bu makalenin amacı maksiller lateral kesici dişlerdeki çift dens invaginatus ve dens evaginatuslu iki vakayı sunmaktır. Detaylı klinik ve radyografik muayene bu tür abnormaliteleri belirlemek için önemlidir. Diş hekimlerinin dens invaginatus ve dens evaginatus'un klinik ve radyografik bulguları hakkındaki farkındalığı erken tanı ve tedavi için önemlidir.

### ANAHTAR KELİMELER

Anomali, dens evaginatus, dens invaginatus, çift, talon tüberkülü

Dens invaginatus is a rare developmental anomaly, probably arises from invagination of enamel organ into the dental papilla, before tooth mineralization and it has a broad spectrum of morphological variations.<sup>1,2</sup> It frequently affects the permanent maxillary lateral incisor, followed by the central incisors, with a higher predominance in the maxillary arch.<sup>3,4</sup> The clinical appearance of dens invaginatus varies considerably and it is diagnosed radiographically.<sup>5</sup> Most of the cases in the literature are single dens invaginatus in same tooth whereas two or three dens invaginatus are rarely reported.<sup>4,6,7</sup> The crown of affected teeth can be of normal morphology<sup>8</sup>, but also be associated with unusual crown morphology such as beg-shaped, barrel-shaped, talon cusp and a greater labio-lingual dimension.<sup>9-12</sup> A deep foramen caecum might be a first clinical indication, exhibiting the presence of an invaginated tooth.<sup>5</sup>

Dens evaginatus is also a developmental anomaly characterized by the presence a tubercle or an extra cusp on the surface of an affected tooth and is found most frequently in premolar teeth.<sup>13-15</sup> It consists of an outer layer of enamel, a core of dentin and may contain a slender extension of pulp horn and appears as a tubercle arising from the occlusal or lingual surface of the tooth.<sup>3,14</sup> Dens evaginatus and talon cusp are names for the same

anomaly. Talon cusp, which is a variation of dens evaginatus, appeared on the lingual surface of anterior teeth.<sup>2,16</sup> Oehlers et al identified five categories according to the pulp contents within the tubercle in evagination.<sup>17</sup> These categories are; I: wide pulp horns, II: narrow pulp horns, III: constricted pulp horns, IV: isolated pulp horn remnants, V. no pulp horn.<sup>14,16,17</sup> The talon cusp was classified three types by Hattab et al<sup>18</sup> These are; Type 1 (Talon): cusp extends at least half the distance from cemento-enamel junction to the incisal edge; Type 2 (Semitalon): an additional cusp of 1 mm or more extending less than the distance from the cemento-enamel junction to the incisal edge; Type 3 (Trace talon) is an enlarged or prominent cingulum and their variations i.e. conical, bifid or tubercle-like (Figure 1).

Talon cusp occurs more frequently in the permanent than in the deciduous dentition and most commonly in the maxillary lateral incisors.<sup>15</sup> Dens evaginatus can cause to occlusal problems, mucosal lesions, an increased risk of caries and pulpal complications.<sup>3</sup> This article reports two cases of talon cusp and double dens invaginatus in maxillary lateral incisors.

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## CASE REPORTS

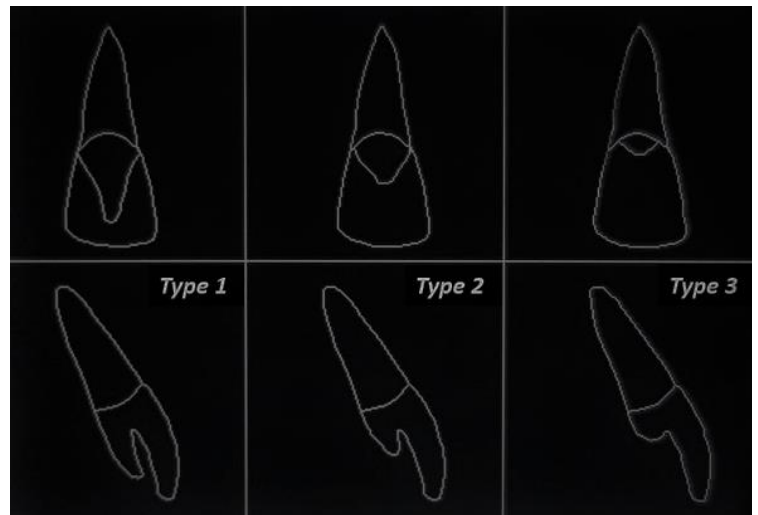
### CASE 1

A 33-year-old female was referred to dental clinic because of bleeding from her gums. The patient's medical history was unremarkable and the extra oral appearance was normal. The intraoral examination revealed moderate oral hygiene condition and some areas were representing marginal gingivitis. The occlusion was normal with no missing teeth; the molars on the left and right side were in a class I relationship. The patient had no caries. The palatal surface of the maxillary left lateral incisor exhibited well-defined developmental grooves or fissure, with a projection dens invaginatus. Mandibular and maxillary bilateral second premolars were exhibited dens evaginatus on the occlusal surface (Figure 2). After comprehensive clinical examinations, periapical radiograph was showed that the left lateral incisor has type I two dens invaginatus with the talon cusp (Figure 3). The right lateral incisor was observed a type I dens invaginatus (Figure 4). The tooth was also asymptomatic, the pulp was vital, no evidence of periapical infection was noted. There was only pigmentation in the invagination surface. In periapical radiography, the accessory tubercles were localized centrally on the mandibular and the maxillary second premolar teeth (Figure 5).

Following periodontal treatment, the patient was referred for prophylactic restoration of the palatal pit of the maxillary left and right lateral incisor to reduce the accumulation of plaque and to avoid risk of caries and pulpal pathology. Since accessory tubercles did not cause occlusal interference, no occlusal adjustment needed. Patient was advised for the routine follow-up examinations twice a year.

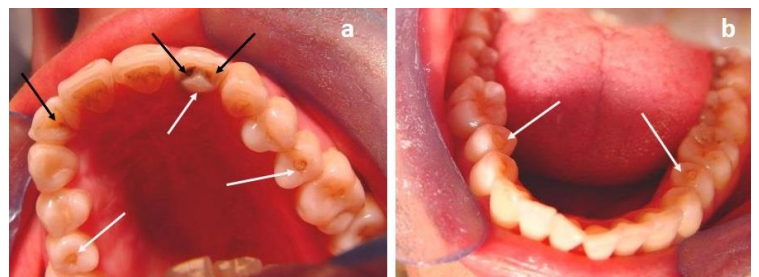
### CASE 2

A 41-year-old male patient attended to our clinic complaining of pain and recurrent swelling in the maxillary right lateral incisor. In extraoral examination, the swelling in the maxilla anterior region was noted. In intraoral examination, a diffuse swelling in the labial vestibule of maxillary right region was observed. Two talon cusps were observed on the lingual surface same tooth (Figure 6). Also, there was severe mobility in the



**Figure 1.**

Figure illustrating the talon cusp types (Hattab's et al<sup>18</sup> classification)



**Figure 2.**

Case 1. Occlusal view of upper dental arch showing combination of dens invaginatus and dens evaginatus (talon cusp) on the palatal surface of left lateral incisor, dens invaginatus on the right lateral incisor and dens evaginatus both on the left and right second premolars (a), occlusal view of lower dental arch showing dens evaginatus both on the left and right second premolars (b)



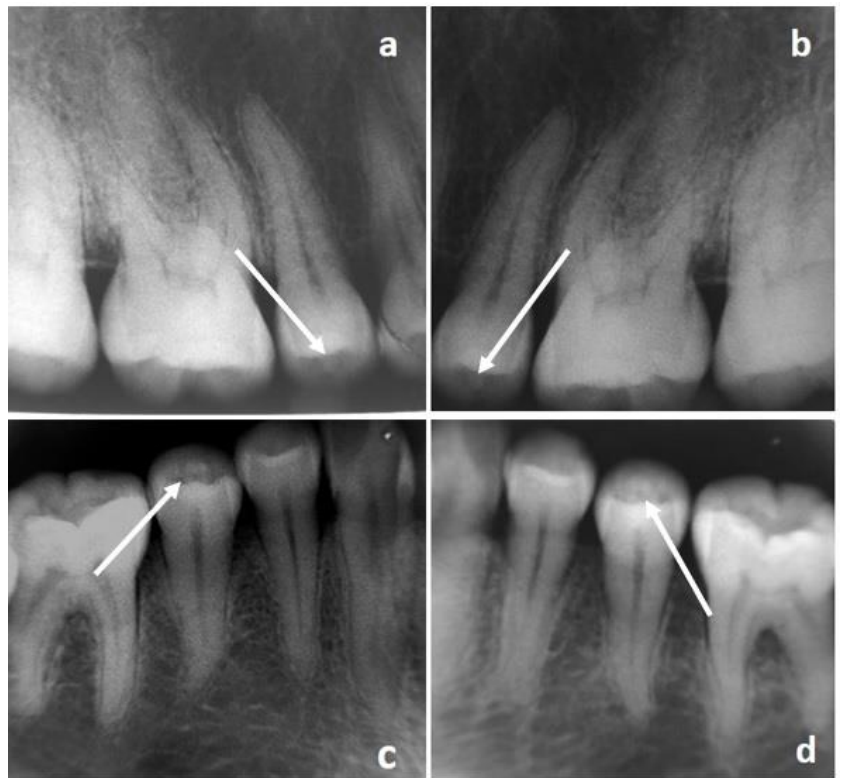
**Figure 3.**

Case 1. Periapical radiograph of the left lateral incisor showing two type I dens invaginatus and V-shaped radiopaque structure of talon cusp

maxillary right lateral incisor and oral hygiene condition was bad. In periapical radiography showed two dens invaginate extending to the root originating from two pits of lateral incisor. Two V-shaped radiopaque talon cusps extending from the cingulum towards the incisal edge were revealed. Also, dental caries, radiolucency of the apical region, internal and external root resorption were observed (Figure 7). Treatment was planned to tooth extraction due to bad oral hygiene and severe tooth mobilite. Antibiotic treatment with amoxicillin/clavulanic acid as an oral medication was carried out for 5 days and nonsteroidal anti-inflammatory drug (NSAID) was also started for pain management. Tooth extraction was carried out under local anesthesia.



**Figure 4.**  
Case 1. Periapical radiograph of the right lateral incisor, showing type I dens invaginatus



**Figure 5.**  
Case 1. Periapical radiograph of the right (a) and left (b) maxillary second premolars, right (c) and left (d) mandibular second premolars showing radiopaque accessory tubercles of dens evaginatus



**Figure 6.**  
Case 2. Intraoral view of the maxillary showing the talon cusp and groove on the palatal surface of the right lateral incisor



**Figure 7.**

Case 2. Periapical radiography showing a maxillary right lateral incisor with double dens invaginatus and double talon cusp

## DISCUSSION

The etiology of dens invaginatus is not fully understood, however seems to involve both genetic and environmental factors.<sup>1,19</sup> Infection, trauma and altered external pressure, or forces on the tooth germ during development from surrounding tissues may also contribute to the etiology.<sup>1,20</sup> In order to characterize the degree of malformation associated with dens invaginatus, the classification by Oehlers (1957) is widely used. According to the depth of invagination has been classified three distinct types.<sup>20,21</sup> Type I, it is a minor form, represents an enamel-lined invagination, remaining confined to the coronal part of the tooth and this is the most common type. Type II describes the extension of the invagination into the root, beyond the cemento-enamel junction, ending as a blind sac. The latter type may or may not communicate with the dental pulp. Type III includes penetration of the root by the invagination to form an additional apical or lateral foramen; usually there is no communication with dental pulp.<sup>1,14,20</sup> The etiology of dens evaginatus is not known; genetic and/or environmental factors may lead to the development of cusp. Talon cusp affects both sexes and commonly is unilateral but one fifth of the cases are bilateral.<sup>15</sup>

According to best of our knowledge, although cases of single dens invaginatus are reported relatively frequently in the literature, two or more dens invaginatus cases in the same tooth are rarely reported.<sup>3,4,6,7</sup> Hulsmann revealed that only 14 cases of double dens invaginatus.<sup>20</sup> In the first case report describes a type I dens invaginatus and type I dens

evaginatus (talon cusp) on the same tooth and multiple dens evaginatus in the same patient. Second case was "type 1" because invagination cavities did not extend beyond the cemento-enamel junction, and type I and II talon cusp (two talon cusps) were present in the same tooth. Such a combination, in a single tooth, is highly rare finding.

Dens invaginatus is clinically significant due to tendency for caries and cause pulpal complications especially. It is usually asymptomatic and incidental findings made during routine clinical and radiographic examination.<sup>2</sup> Therefore, comprehensive clinical and radiographic examinations are beneficial to determining such abnormality and may prevent future complications of these conditions.

Clinical problems of dens evaginatus are fracture or wear of the tubercle, occlusal interference, attrition, irritation to tongue, plaque accumulation, dental caries.<sup>2,13,14</sup> Small tubercles are asymptomatic and treatment don't need. However, fracture or wear of the tubercle in teeth with dens evaginatus could lead to pulp necrosis, various prophylactic treatments have been suggested to treat before symptoms occur.<sup>13</sup> Therefore, the treatment of talon cusp implicates careful clinical decision.<sup>15</sup> The treatment choices include; application of resin to reinforce the tubercles, placement of prophylactic restorations, selective grinding of the tubercles, extraction and partial pulpotomy.<sup>13</sup>

Various treatment modalities have been proposed for dens invaginatus, including application of fissure sealant to a conservative restoration of the opening, to endodontic treatment and even extraction of the tooth.<sup>2,9</sup> Following early detection of dens invaginatus, conservative treatment with fissure sealant and/or a resin composite can prevent future complications.<sup>2</sup> In the first case, dens invaginatus was covered with composite restoration followed by fissure sealant. Since the talon cusp on the left maxillary lateral incisor did not irritate the tongue during speech and mastication and did not interfere with the occlusion, no occlusal adjustment needed for the presented one case. In the second case was observed severe mobility, wide periapical pathology and external-internal root resorption. These symptoms were occurred because diagnosed late. Unfortunately, tooth extraction was carried out.

In conclusion, this report presents two cases of double dens invaginatus and dens evaginatus in permanent maxillary lateral incisors. Simultaneous occurrence of dens evaginatus and dens invaginatus in a single tooth is extremely rare. The awareness of dentists about clinical and radiographic findings of dens invaginatus and dens evaginatus is important for early diagnosis and treatment. Thus, future pulpal complications can be prevented.

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