

## Dens Invaginatus Clinically Presenting As A Talon Cusp – A Case Report.

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**Abstract :** Dens invaginatus results from an in-folding of the dental papilla during tooth development. Affected tooth show deep surface invagination of the crown or root that is lined by enamel. Maxillary lateral incisors are commonly affected and may occur unilaterally or bilaterally. Dens invaginatus exhibits different morphologic variations and often results in pulpal pathosis. A talon cusp on the other hand is an accessory cusp like structure occurring on the lingual or facial surfaces of deciduous or permanent anterior dentition especially the maxillary lateral incisors. It may also occur unilaterally or bilaterally. Its co-occurrence with dens invaginatus is extremely rare. The article discusses the clinical and histological features, and therapeutic considerations along with a case report of a Dens Invaginatus, which clinically presented as a Talon cusp.

**Keywords:** Dens invaginatus, Dens in dente, Talon cusp, Odontome

### I. Introduction

Dens invaginatus is a rare dental malformation, with variations in its morphologic patterns. It is developed by an in-folding of dental papillae during tooth formation. This in-folding provides a ‘tooth with-in tooth’ appearance radiographically. It was described first by Ploquet in 1794, in a whale’s tooth. ‘Socrates’ in 1856 noted its existence in a human tooth.[1] It is also referred in literature as Dens in dente, tooth inclusion, invaginated odontome, dilated gestant odontome, dentoid in dente, dilated composite odontome . Talon cusp was first recognized by WH Mitchell in 1892 in a maxillary central incisor. Mellor and Ripa in 1970 named it as “Talon Cusp” because of its resemblance to eagle’s talon. [2,3] It occurs as a result of outward folding of the inner enamel epithelial cells and a transient focal hyperplasia of the mesenchymal dental papilla. It also exhibits varied morphological patterns like true talon, semi talon and trace talon. It may occur as an isolated dental anomaly or in association with other anomalies or even with some syndromes. Co-occurrence of talon cusp with dens invaginatus is extremely rare. This article features a report of talon cusp co-existing with dens invaginatus. The diagnosis of such a co-existence is crucial as it affects the treatment plan and the prognosis.

### II. Case Report

A Fifty two year male patient reported for correction of spacing between his upper front teeth. He was otherwise asymptomatic. Intra-orally, there was spacing between right maxillary central incisor, left maxillary central incisor and left maxillary lateral incisor. There was gingival recession and deep periodontal pockets in relation to those tooth. All the incisors showed Grade II mobility. A morphological alteration (enamel covered tubercle) was noted on the palatal aspect of crown of right maxillary lateral incisor, but was not interfering with the occlusion (Fig 1). The external appearance of the crown indicated a possible Talon cusp.

Intra oral periapical radiographs were advised to assess the bone support in relation to the maxillary incisors. The IOPA showed a radiopaque structure within the crown of right maxillary lateral incisor, crossing the cemento-enamel junction and extending up to the apical third of the root. The difference in radio densities of the structure suggested an enamel lined cavity extending upto the apex without any communication to the pulp. A typical presentation of tooth within a tooth confirmed the diagnosis of Dens invaginatus - Type III (Fig 2). There was a well defined radiolucent lesion of size 7 X 7mm with a corticated border in the periapical region of right maxillary lateral incisor suggesting a periapical granuloma.

All the possible treatment options were explained to the patient. But the patient insisted on extraction and prosthetic replacement. All the maxillary incisors were extracted and an immediate RPD inserted. Patient is scheduled for an FPD with maxillary canines as abutments. The extracted tooth (Fig 3) was sectioned and examined microscopically. The microscopic findings were confirmatory for Dens invaginatus. (Fig 4).

### III. Discussion

#### 3.1. Clinical features

The invagination provides an easy access for irritants into an area which is bounded by only a thin layer of enamel and dentine and in some cases even the enamel-lining is incomplete. Existence of channels

between the invagination and the pulp has also been reported. [1] Since this area is very close to the pulp, pulpal necrosis is a common sequelae, rather an early one, sometimes even before root formation is complete.[4] Abscess formation, displacement of teeth ,retention of neighbouring teeth, internal resorption and associated cysts are other reported sequelae. Dens invaginatus may occur in coincidence with other dental anomalies, malformations and dental or medical syndromes. [5,6]

### **3.2. Histological findings**

Microscopic examination of dens invaginatus shows varied findings ranging from hypomineralized or irregularly structured dentine [7] to an intact one without any irregularities or dentin containing vital connective tissue or fine communications to the pulp. [8,9] The enamel has been reported as irregularly structured and, hypomineralized at the base of the invagination whereas a chemical analysis showed up to eight times more phosphate and calcium compared with the outer enamel, but magnesium was missing completely.[7,9]

### **3.3. Treatment considerations**

#### **3.3.1. Preventive and restorative treatment**

Once the presence of invagination is confirmed, the opening should be treated with a pit and fissure sealant before caries ensues. A composite restoration and strict periodic review is recommended. [10] A regular follow-up is only that is recommended if no entrance to invagination is detected and no clinical and radiographical signs of pathosis are evident. [11]

#### **3.3.2. Root canal treatment**

Until 1970s, extraction of the involved teeth was the only recommended treatment procedure. With the introduction of endodontic procedures, either conventional root canal treatment [12] or root canal therapy of the invagination alone [13] was emphasized. The latter one was indicated when there were no signs of pulp pathosis and no communication between the root canal and invagination exists. Even a composite or amalgam filling of the invagination would be adequate. A separate apical or lateral foramen for the invagination also favours root canal treatment of invagination alone. [11] Another option is to get an access through the invagination to the apical foramen following which conventional root canal therapy is completed.

#### **3.3.3. Surgical treatment**

Extraction is indicated in endodontic failure cases and in cases where severe anatomical irregularities prevents an easy access. When abnormal crown morphology presents aesthetic or functional problems, extraction is justified. [10] Patient's reluctance for endodontic therapy, as in this case, also warrants extraction.

#### **3.3.4. Treatment for talon cusp**

Small talon cusp don't require any treatment as they are usually asymptomatic. A definitive talon may pose esthetic, functional, occlusal, periodontal problems and should be treated appropriately. The developmental grooves on the lateral aspect of talon cusp should be cleaned of debris and plaque and prophylactically sealed with pit and fissure sealants. The occlusal interferences may necessitate cusp recontouring at 6-8 weeks interval for allowing formation of reparative dentin. After grinding, the surface should be coated with topical fluoride varnish or desensitizing agent. In extreme cases, elimination of cusp may necessitate root canal treatment.

## **IV. Figures**



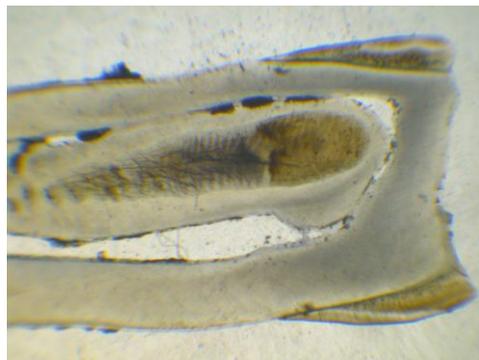
**Figure 1-** talon cusp on right maxillary lateral incisor.



**Figure 2-** periapical radiograph showing dens invaginatus.



**Figure 3-** extracted tooth



**Figure 4-** Microscopic view of sectioned tooth

## V. Conclusion

Since maxillary lateral incisors are the most commonly involved tooth, any alteration in the morphology of crown should be carefully dealt and the possibility of dens invaginatus should be ruled out with the help of radiographs. If confirmed, proper execution of the treatment can still prevent the tooth loss.

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