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**Case Report**

# Double dens invaginatus in maxillary lateral incisor of a 12-year-old child: report of an unusual case

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## ABSTRACT

Amongst the anatomic anomalies of shape of the teeth, dens invaginatus shows infolding of enamel organ into dental papilla whereas shoveling represents infolding of mesial and distal margins on lingual side. Clinically and radiographically, both are associated anomalies, common in anterior teeth, also known as "tooth within tooth" and as a "scoop." Present case showed permanent maxillary right lateral incisor, with a talon's cusp like anatomy seen clinically and two separate teeth like structures within the crown seen radiographically, diagnosed as dens invaginatus. Intraoral periapical (IOPA) showed sshoveling in both central incisor and left lateral incisor teeth. As no pathological signs and symptoms were present, conservative treatment with composite restoration was done in carious lateral incisor while pit and fissure sealant were carried out in other incisors as a precaution. Periodic check-up was advised which includes preventive strategies. Management of dental anomalies depends on the extent of defect and requires clinical and radiographic investigations along with preventive treatment plan. Thorough examination, early detection, treatment and periodic follow-ups are important to prevent complications in anomalous teeth.

**Keywords:** Dens invaginatus, Shovel teeth, Enamel organ

## INTRODUCTION

Dental anomalies represent altered normal odontogenesis. These may be due to genetic mutations, metabolic disorders or environmental factors including physical, chemical, and biological insults. Most common anatomic anomalies of teeth are peg shaped lateral, Talon's cusp, and microdontia. Dens invaginatus (DI) is a rare developmental anomaly where an infolding of the enamel organ into the dental papilla is seen. This happens during the phase of morpho differentiation of tooth.[1] Before its calcification begins, forming a furrow of enamel and dentin within the crown or root leading to a radiographic appearance of a "tooth within a tooth." Busch (1897) referred to the anomaly as "dens in dente". Oehlers' (1957) categorized DI into three types based on depth and apical extension as a radiographic feature.[2] The word shoveling is referred to anterior teeth with prominent mesial and distal palatal ridges and is frequently associated with DI. It shows infolding of mesial and distal marginal ridges enclosing central fossa on lingual surface of teeth.[3]

Although it is not uncommon to find solitary dense in dente or dense invaginatus in a tooth, it is rare to find 2 such invaginations in a single tooth. We present here a case showing a unique DI of types I and II in permanent maxillary right lateral incisor with two separate teeth like structures seen distinctly on radiograph. Along with that the phenomenon called shoveling was also seen in both permanent maxillary central incisors in the same patient.

## CASE REPORT

A 12 years old male patient visited the department of pedodontics and preventive dentistry at FDS, DDU, Nadiad, India, for dental treatment of posterior teeth which had symptoms of mild pain. Intraoral examination showed mixed dentition with normal chronologic order of eruption of teeth. Upon general dental examination, talons-cusp (Figure 1a) like anomaly with deep pits was seen in permanent maxillary right lateral incisor which was already affected with dental caries. The tooth exhibited normal response to vitality tests. Along with this, on clinical photographs and digitally scanned model (Figure 1c), both maxillary right and left central incisors were found to exhibit grade I shoveling (Figure 1 b) according to Hanihara and Sciulli's classification. Although there was no exaggerated prominence of the marginal ridges on clinical examination, however on radiographic examination both central incisors displayed unusual depth of the palatal pits.

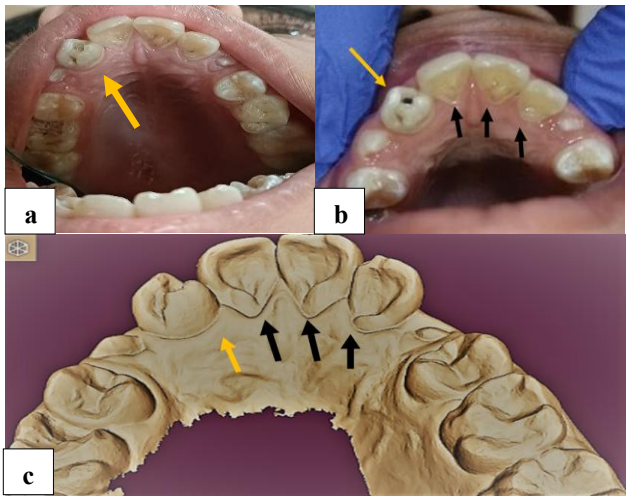


**Figure 1: (a) Dens invaginatus – yellow arrow, (b) shoveling of incisors – black arrow, and (c) digital scanned model (DI and shovel).**

In the IOPA radiograph, the permanent maxillary right lateral incisor showed enlarged pulp chamber and root canal. Although the apex appeared closed, the canal showed unusual width. Two teeth like structures were also seen along with their own distinct pulp-like areas. These appeared to be in continuation with the two palatal pits. The pulp canals of these invaginations did not appear to have any communication with the main canal of the lateral incisor (Figures 2a and b) This pattern was suitable to classify it as type I and type II DI according to Oehler's classification (Figures 3a and b). Along with this, both permanent maxillary central incisors (Figure 2b) showed shoveling which was seen much more clearly on digitally scanned images (Figure 1c) than on photographs or clinical examination. While appropriate restorative treatments were being carried out for the other teeth, the lateral incisor was restored with light cure composite restoration and the rest of the incisors were treated with glass ionomer-based sealant as a part of prevention.

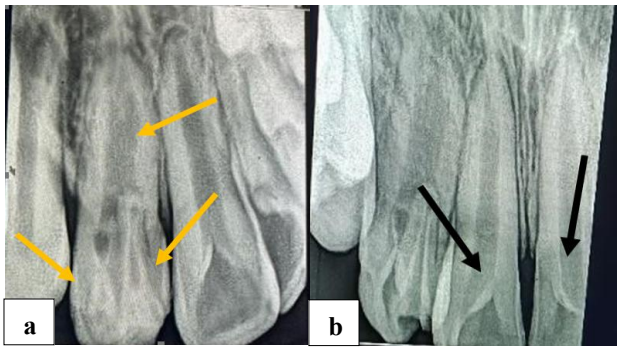


**Figure 2: (a) Twin DI in permanenent maxillary right lateral incisor with separate root canals, and (b) shoveling in permanent maxillary central incisors.**

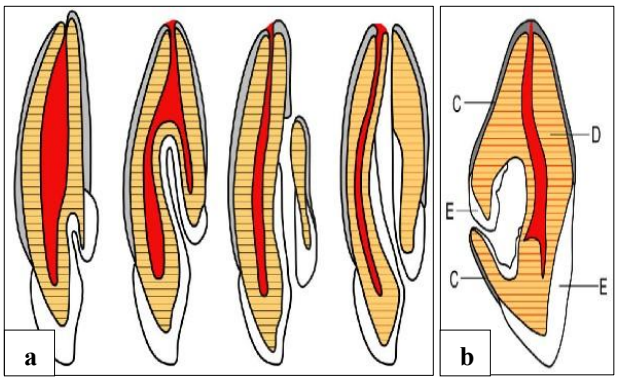


**Figure 3: Oehler's classification of dens invaginatus (a) the 4 types differ based on the location and depth of the lesion, and (b) radicular dens invaginatus presents as an infolding along the root of a tooth which does not affect the crown.**

## DISCUSSION

DI was first discovered in whale dentition by 'Ploquet' in 1794 and first reported in human teeth by a dentist named 'Socrates' in 1857.[2] There are multiple classifications of the condition such as given by Hallet and Gul et al but the one by Oehlers is still useful due to its simple and clinical approach amongst all.[4] According to that type I is Limited to the crown, type II is an invagination that extends beyond the Cemento-enamel junction to form a blind sac through the root, with or without communication with the dental pulp, type IIIa having an enamel-lined infolding that penetrates through the root, opening an independent lateral foramen with no pulpal communication with the main canal and type IIIb exhibits an enamel-lined infolding that penetrates through the root, opening an independent apical foramen with no pulpal communication.[3]

Shovel shaped incisors were classified from 0 to 3 by Hanihara and Sciulli where grade 0 is given to incisors having no shovel shape and smooth lingual surfaces, grade 1 having semi shovel with slight elevation of marginal

ridges, grade 2 exhibiting slight shovel shape with visible marginal ridges and grade 3 having strong shovel, broad and heavy marginal ridges on the palatal area.[5]

Clinically, DI ranges from a small pit to a large infolding on the palatal surface of a tooth. It can be present as a talon-cusp or a bifid, peg shaped or barrel shaped cingulum.[1,3,4] The palatal area may appear larger than normal, or may have no clinical signs of the anomaly, whereas shovel anterior teeth show pronounced marginal ridges on lingual surface accentuating the lingual fossa as hollowed out areas with increasing susceptibility to caries, and sometimes only visible in IOPA X-ray.[3] Root area in such teeth may show dilated pulp space with communication with periodontal ligament along with periapical infection and sinus tract formation.[4] Other anomalies that are frequently found in such teeth include a tooth like structure showing separate root canals, odontoma, obliterated dentin, fusion and/or gemination.[4] Ilana et al study reports that amongst various dental anatomy, DI is commonly present in patients with cleft lip and palate. It also shows syndromic correlation.[1,2] Geographically, shovel teeth are more commonly found in people with Chinese, Eskimo, and American Indian ethnicity.[2,3]

Developmental anomalies occur during embryological development of teeth before calcification begins. Events like ecto-mesenchymal developing disorder, tooth bud stimulation, insufficient local development of enamel, abnormal pressure by the surrounding tissues on the tooth germ, infections occurring during tooth development, as well as hereditary factors may play a role in the formation of dens invaginatus. The most commonly associated teeth with DI are permanent anterior teeth particularly lateral incisors.[1] This condition may be found either on one side or bilaterally in the anterior region (43%) and is reported rarely in posterior teeth.[3] Early clinical and radiographic investigations are useful to prevent complications such as periapical infections and tooth loss. As this condition may not be noticed at all by patients, it is crucial that a thorough clinical examination be carried out for all teeth and treatment planning should include preventive treatments due to difficulties in carrying out satisfactory endodontics in such teeth.

## CONCLUSION

The management of DI and shovel teeth depend on extent of defect, caries status and pulp and periapical involvement of the concerned tooth. Unique dental anatomy of such teeth requires a comprehensive approach with clinical investigations, periapical radiographic images, and if needed CBCT can be done for accurate diagnosis and regular follow up. We found digitally scanned images to be more accurate in highlighting the condition in our case.

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