Dens Invaginatus in a Peg Lateral - An Unusual Presentation
Eswara Uma

ABSTRACT
Dens invaginatus is a developmental anomaly resulting from infolding of the surface of the tooth crown before calcification has occurred. While several mechanisms have been proposed for the cause of this phenomenon the exact etiology is not known. The malformation shows a broad spectrum of morphologic variations and frequently results in early pulp necrosis. The nature of the problem may increase the risk of pulp disease and complicate any root canal treatment. Dens invaginatus has been seen very commonly in maxillary lateral incisors; however, reported cases in peg laterals are few. A case is reported here of unusual presentation of dens invaginatus in a peg lateral. The problems associated with treatment of such teeth are discussed.

Keywords: Dens in dente, Dens invaginatus, Peg lateral, Dilated composite odontoma, Dentoid indente.

INTRODUCTION
Dens invaginatus is a rare malformation of the teeth resulting from the invagination of the tooth crown before biological mineralization occurs. Dens invaginatus in a human tooth was first described by a dentist named ‘Socrates’ in 1856; however, it was Tomes in 1887 who described the dens invaginatus in detail in his text book. Synonyms for Dens invaginatus are: Dens in dente, invaginated odontome, dilated gestant odontome, dilated composite odontome, tooth inclusion, dentoid in dente[1]. Its prevalence is estimated to range from 0.25% to 10%[2] with greater frequency in the maxillary dentition. Dens invaginatus may occur in 6.6–9.7% of maxillary incisors and bilateral involvement often is reported[3, 4, 5, 6]. Invagination of mandibular incisors is even more uncommon and has only been reported in isolated case reports[7, 8].

Three classification systems have been given for dens invaginatus i.e. Hallett GE (1953), Oehlers (1957), Schulze C (1970)[9, 10, 11]. The most widely used classification system is the one given by Oehlers (1957) which is based on the extent of the invaginated dental tissue. As per this classification Type I is characterized by the invagination confined within the crown, extending only to the cementoenamel junction. Type II is characterized by the invagination extending apically beyond the cementoenamel junction, where connection between the invagination and the pulp is possible and type III is characterized by the invagination extending beyond the cementoenamel junction and exhibiting a second foramen into the lateral periodontal ligament or periradicular tissue.

These anomalous teeth present a challenge to the clinician. While teeth demonstrating dens invaginatus may cause aesthetic, orthodontic, and prosthetic problems, acute odontogenic infection is a possible sequelae[12]. A case is reported here of dens invaginatus in peg lateral and problems associated with the presence of such teeth are discussed.

CASE REPORT
A 12-year-old male child reported to the dental clinic with the history of severe pain and swelling in left side of palate since three days. Patient did not give any
previous history of trauma or swelling. On examination a well-circumscribed swelling was present on left side of palate along the midline (Figure 1).

The swelling was tender. Hard tissue examination revealed mixed dentition with no obvious decay in any teeth. The total number of teeth in the anterior region was normal and no discoloration was noted in any teeth. In the maxillary arch peg lateral incisors were present bilaterally and the left peg lateral incisor had not fully erupted. Careful examination of the left lateral incisor revealed a pit on the labial surface at the junction of middle and incisal third which was partially covered by gingiva. Pulp vitality tests showed no response from the left maxillary peg lateral incisor. Radiographic examination revealed the presence of an immature
Oehlers type III dens invaginatus in relation to 22 and a radiolucency area in the periapical region.

A large invagination extended from the crown to the apex of the root (pseudocanal), with no evident communication with the main canal. A foramen caecum was visible as radiolucency on the crown (Figure 2). After administering local anesthesia with 2% xylocaine, access to the pseudocanal was achieved through the foramen caecum (Figures 3 and 4). Putrid and foul smelling necrotic material was removed from the pseudocanal and it was debrided thoroughly with normal saline alternating with 5% hypochlorite solution. The patient was placed on systemic antibiotics (Amoxicillin 500 mg, thrice daily for 7 days and Metronidazole 400 mg, thrice daily for 7 days). Patient was recalled after 3 days to observe the palatal swelling. The swelling had reduced significantly though it still persisted. The pseudocanal was sealed with calcium hydroxide paste and the patient was recalled after 15 days. After 15 days though the palatal swelling had subsided completely the tooth was tender. On removing the dressing again fetid discharge was seen. The canal was irrigated with normal saline and calcium hydroxide paste was placed again in the main canal and the pseudocanal. Patient was recalled after 15 days. However, the patient reported after 3 months and complained of tenderness and pain in the tooth again. Foul smelling discharge was noted from the pseudocanal. Extraction of the tooth was done since the tooth was not responding to conservative management. Ground section of the extracted tooth showed a central pseudocanal surrounded by the pulp on the periphery (Figure 5).

DISCUSSION

Dens invaginatus is a developmental anomaly resulting in a deepening or invagination of the enamel organ into the dental papilla prior to calcification of the dental tissues[1]. The cavity formed retains external communication through the foramen caecum. The etiology of this phenomenon has been controversial and remains unclear. However, many theories have been proposed which include: (a) growth pressure of the dental arch resulting in buckling of the enamel organ, (b) focal failure of growth of the internal enamel epithelium, (c) rapid and aggressive proliferation of a part of the internal enamel epithelium, (d) a fusion of two tooth-germs, (e) infection, (f) trauma, (g) genetic factors have also been implicated[5,13,14].

Several treatment modalities exist for type III Dens invaginatus depending on the internal anatomy and condition of the pulp. These are restoration of the foramen caecum, root canal treatment, combined root canal and surgical treatments and extraction[15].

The present case was classified as type III as the radiograph revealed that the invagination through the labial pit extended through the complete root canal and had formed an additional apical foramen. In the absence of any dental caries and any history of trauma, microorganisms from the oral cavity had access to apical tissues and caused inflammation. Pulp probably becoming necrotic secondarily by retrograde infection from communication with invagination canal is also a possibility. The development of periapical inflammation and necrosis of pulp probably affected the root end closure[2] and its complete eruption. Most of the cases of dens invaginatus reported in the literature presented with a history of swelling in the labial sulcus as the root apex is closer to the buccal plate owing to complete eruption. However, in the present case the patient came with an unusual presentation of a palatal swelling. This probably occurred due to proximity of the apex of the partially erupted maxillary left peg lateral to the palate.

Dens invaginatus is an endodontic challenge due to complicated morphology and complex associated root canals and the presence of communication between the invagination and pulp has a prognostic value[16]. In the present case complete debridement of the invagination could not be done. This probably caused incomplete resolution of the periapical inflammation despite intracanal medicament being placed. In the ground section of the extracted tooth it was observed that complete debridement was not easy owing to the tortuosity of the invagination as well as the pulp thereby contributing to repeated bouts of pain and
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