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## RESEARCH ARTICLE

### CASE REPORT: ENDODONTIC MANAGEMENT OF DENS IN DENTE.

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#### Abstract

Dens invaginatus is a developmental malformation of teeth, most commonly affecting maxillary lateral incisors. The cleaning and debridement of such root canal systems are extremely challenging because of their complicated anatomy. Incomplete elimination of the invagination and debridement may create dead spaces within the canal leading to failures. This case report presents the successful endodontic treatment of Oehler's type II Dens invaginatus.

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#### Introduction:-

Dens Invaginatus has been defined as a defect in tooth development, characterized by invagination of the enamel organ before the calcification phase<sup>1</sup>. As the hard tissues are formed, the Invaginated enamel organ produces a small tooth within the future pulp chamber. Tooth crowns as well as roots may exhibit variation in size and form<sup>2</sup>. Other names for this type of malformation are dens in dente, invaginated odontoma, dilated gestant odontoma, dilated composite odontoma, tooth inclusion, and dentoid in dente<sup>2</sup>.

The aetiology of dens invaginatus malformation is controversial and remains unclear. Over the last decades several theories have been proposed to explain the aetiology of dental coronal invaginations. Several theories have illustrated the etiology of dens invaginatus, however at the present time they remain unclear. Kronfeld speculated that dens invaginatus is caused by a failure in growth of the internal dental epithelium while at the same time there is also a proliferation of the surrounding normal epithelium, producing a static area of engulfing<sup>2,4</sup>. Oehlers considered that the distortion of the enamel organ during tooth development and the subsequent protrusion of a part of this can lead to a formation of a lineal enamel canal that ends at the cingulum and in some cases at the incisal border, producing an irregular crown shape<sup>2,4</sup>.

Dens invaginatus has been classified into the following 3 types Oehlers (1957) according to the depth of the invagination and the degree of communication with the periodontalligament or the periradicular tissues is shown below<sup>2,3,4</sup>.

**Type I:** An enamel-lined minor form occurring within the confines of the crown not extending beyond the cemento-enamel junction. Fig1: (a)

**Type II:** An enamel-lined form which invades the root but remains confined as a blind sac. It may or may not communicate with the dental pulp. Fig1: (b)

**Type III A:** A form which penetrates through the root and communicates laterally with the periodontal ligament space through a pseudo-foramen. There is usually no communication with the pulp, which lies compressed within the root. Fig1: (c)

**TYPE III B:** A form which penetrates through the root and perforating at the apical area through a pseudoforamen. The invagination may be completely lined by enamel, but frequently cementum will be found lining the invagination. Fig1: (d)

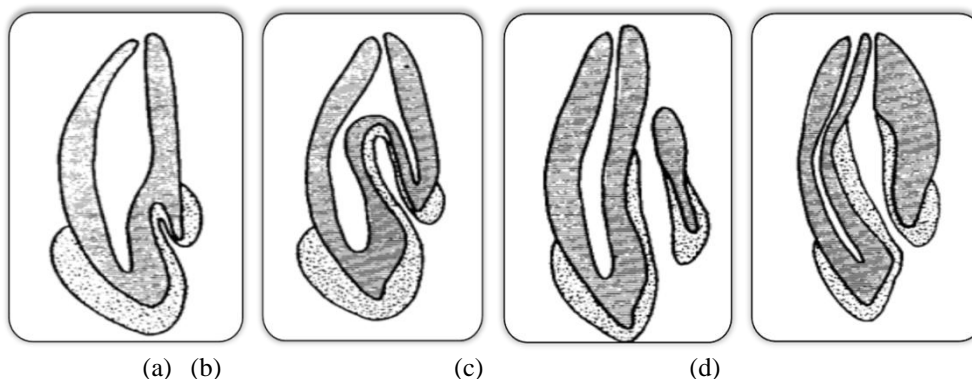


Fig1: (a) Dens invaginatus : Type I, (b) Dens invaginatus: Type II, (c) Dens invaginatus: Type III A, (d) Dens invaginatus: Type III B

Most cases of dens invaginatus are detected after a routine radiographic evaluation with a panoramic x-ray and confirmed with a periapical film. Clinically, a morphologic alteration of the crown or a deep foramen coecum can serve as an indication for the diagnosis of dens invaginatus. On the other hand, the main reasons for consultation are acute pain and inflammation. Histologically, fragile hypomineralized enamel is frequently seen at the site of the invagination; this condition facilitates the formation of dental caries and the penetration of microorganisms from the saliva directly into the pulp, leading to pulp necrosis and the development of a periradicular inflammatory process.

Several treatment modalities have been described for these teeth, all of them related to the degree of complexity of its anatomy. These include nonsurgical endodontic treatment, endodontic surgery, intentional replantation, and finally extraction. In cases where there is an immature apex, the use of calcium hydroxide inside the root canal has been proposed to stimulate apexification.

This article presents a case report of the successful treatment of dens invaginatus type II with a diagnosis of pulp necrosis and chronic periradicular abscess.

### Case report:-

A 35 year old male patient reported to the Post Graduate Endodontic clinic at Farooqia Dental college, Mysore with the chief complaint of a discolored tooth in the upper left front region since 4 years. There was no history of either trauma, pain and medical history was non contributory.

Clinical examination of the maxillary left lateral Incisor gave the appearance of being DensInvaginatus(**Fig 2: a**). Tooth was not tender to percussion. The evaluation of soft tissues showed no sinus tract in the vestibular gingival region. Intra Oral Periapical radiographs were made. A smallperiapical radiolucency with indefinite borders was seen associated with the involved tooth (**Fig 2: b**). Vitality test was performed on 22, which gave no response. Diagnosis was made as Dens Invaginatus with necrotic pulp with periapicalabcess. In the present case there is a tear-shaped ribbon-like formation of the invagination cavity and the presence of blunting of the pulp canal horns because of the encroachment by the invagination suggesting Oehlers' Type II(**Fig 2: b**). Hence endodontic treatment was recommended for 22.

Tooth was anesthetized using 0.5 ml of 2% lidocaine with 1:80,000 adrenaline(Lignox) and the tooth was isolated with a rubber dam and a traditional palatal access opening was made to expose the invagination. The length of both canals were established and recorded with an apex locator (E magic finder EMF-100) and confirmed with radiograph (**Fig 2: c**). Chemo mechanical cleaning was performed on the inner cavity of the invagination. The invagination and rudimentary canals were eliminated until a wide canal was obtained with the use of manual K files sequentially from sizes #40 to 80 (Mani Files, Japan) and with the use of Gates-Glidden drills no.1, 2, 3 (Mani, Japan) in crown down technique. The disinfection was carried out with 3.25% solution of sodium hypochlorite.

The canals were dried, calcium hydroxide intra canal dressing was placed and a closed dressing with Cimpat Pink (Septodont) coronal sealing was given. After one week the canal was obturated with guttapercha points with AH plus sealer (Dentsply) by lateral condensation technique(**Fig 2:d**). Coronal access restoration was done by direct composite followed by porcelain fused metal crown. A six months follow up radiographs revealed the resolution of periapical radiolucency (**Fig 2: f**).

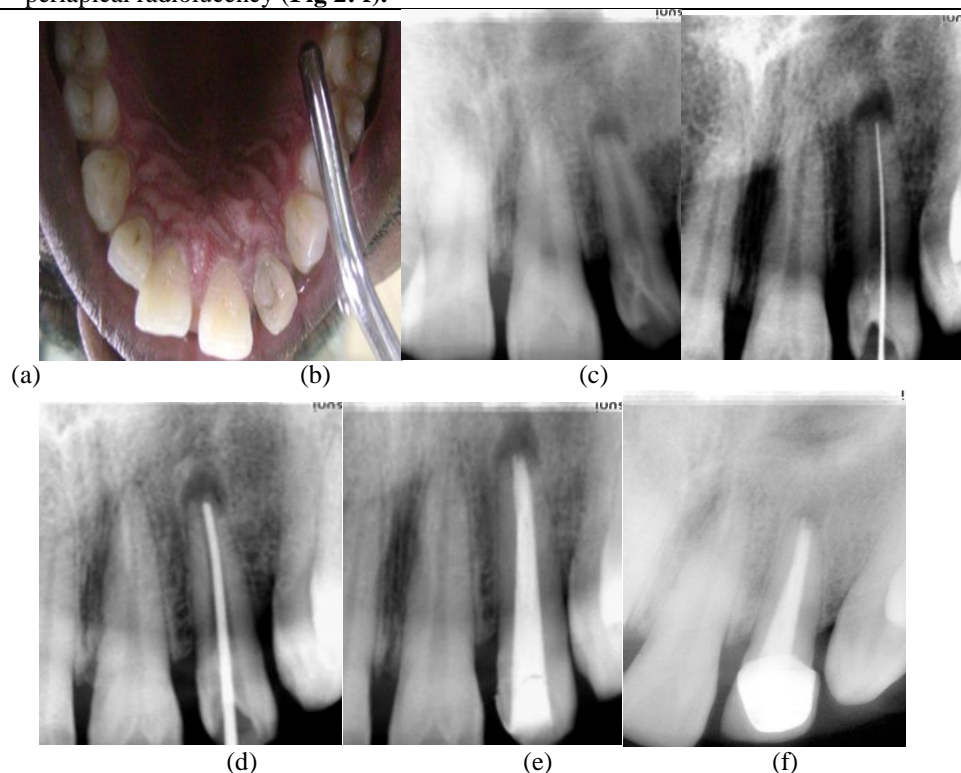


FIG 2: (a) Clinical appearance of left maxillary lateral incisor, (b) Pre operative IOPAR, Working length determination, (d) master cone selection (e) obturation (f) 6 months follow up IOPAR (intra oral periapical radiograph)

### Discussion:-

The incidence of dens invaginatus has been reported to be in the range of 0.04% and 10%, with the upper lateral incisors being the most commonly involved teeth. Nonsurgical endodontic treatment in teeth with dens invaginatus should be the first treatment alternative. Dens invaginatus requires early diagnosis and treatment, as it may result in radicular pathosis. Usually, a patient will not discover an anomaly such as dense invaginatus until clinical signs

appear. However, endodontic treatment of dens invaginatus type II and III can become complicated because of an unpredictable internal anatomy.

The current case of dens invaginatus was classified as Oehlers type II because the radiographic examination showed that the invagination invaded the root but remained confined as a blind sac with no communication with the main canal. In this type of developmental defect, there may be a direct communication between the pulp and the oral cavity. Microorganisms from saliva can infect the pulp and cause necrosis leading to the formation of a periapical lesion.

A complete disinfection of the canal is of great importance to promote healing of affected periradicular tissues<sup>4,5</sup>. In this case, sodium hypochlorite (3.25%) as irrigation and calcium hydroxide as an intracanal medication between appointments were used to obtain this result. In some cases isolated endodontic treatment of the invaginated canal had been sufficient which maintained the pulpal vitality. However, this was not possible in the case presented here as there was a presence of a periapical abscess at the time of initial presentation.

### **Conclusion:-**

Dens invaginatus constitutes a challenge for endodontic treatment, since it presents a complicated canal system. These invaginations act as a niche for bacterial growth and may jeopardize the vitality of the main pulp canal. An early diagnosis of dens in dente is crucial and requires an evaluation of all the teeth especially lateral incisors.

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