



Research Paper

Non-surgical Endodontic Management of Maxillary central incisor with Dens in Dente: A case based report.

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Abstract:

Dens invaginatus, also called as Dens in Dente is a developmental anomaly resulting from the invaginations of the enamel organ into the dental papilla during the soft tissue stage of development. As the hard tissues are formed, the invaginated enamel organ produces a small tooth within the future pulp chamber. These cases may present difficulties with respect to its diagnosis and treatment because of canal morphology. These infolds represent stagnation sites for bacteria and can predispose to dental caries. The carious infection can spread via enamel and dentin to contaminate the pulp and cause soft tissue necrosis. The altered and sometimes complex anatomy of affected teeth can make endodontic management challenging. Early diagnosis is therefore essential as prophylactic treatment of the dens can prevent degeneration and pulpal necrosis. The aim of this article is to review the aetiology, classification, diagnosis and management of teeth affected with dens invaginatus. Emphasis will be placed on describing the clinical features of this anomaly. Treatment options, management strategies and the challenges faced in managing this condition will be discussed. The article presents with case report of Dens in Dente, occurring in maxillary central incisor (rare), unlike most of the cases presenting with prevalence in maxillary lateral incisor.

Keywords: Dens in dente, Developmental anomaly, canal morphology, Maxillary lateral incisor, Maxillary central incisor.

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I. Introduction:

Anomalies are defined as either large or little deviations. Dental anomalies are faults that develop in teeth as a result of genetic abnormalities or environmental factors. Dens invaginatus is one such peculiar dental development disorder, a situation involving the permanent teeth. A deep enamel-lined surface invagination of the crown or root results from the enamel organ's invasion of the dental papilla during odontogenesis. The term "dens in dente," which refers to the radiographic appearance of a tooth inside another tooth, was proposed by Busch in 1897 and has been used by a number of authors to describe this abnormality [9]. Hunter first used the term "dilated composite odontome" in 1951 to describe an abnormal dilatation of the dental papilla [3]. Colby suggested the

use of "gestant anomaly" in 1956. [10] [11]. A deep hole bordered with enamel that extends into the underlying dentine at variable depths, frequently displacing the pulp chamber and occasionally changing the morphology of the root, is what is meant by the term. According to some writers, dens invaginatus is the consequence of the foramen cecum bending deeply during tooth formation, creating a second apical foramen. It has been assumed that the aetiology of this disorder has something to do with localised external pressure on particular tooth bud regions, regional growth stimulation, or focal growth retardation. This does not, however, provide an explanation for cases of bilateral dens invaginatus. The maxillary lateral incisors are the most typical location for dens invaginatus. . The identification of this anomaly is little difficult and needs a keen observation. In this article etiology, prevalence, classification, clinical and radiographic features, and treatment options for dens invaginatus in a Maxillary central incisor is described in detail along with a case presentation. Choice of treatment varies from preventive aspects in lenient cases to extraction in severe cases. The reported incidence for dens invaginatus ranges from 0.04 - 10%. Teeth commonly involved are the maxillary lateral incisors and usually bilateral occurrence is observed (43%)[14] .Although mostly asymptomatic, *dens in dente* has been reported to be associated with various syndromes such as Ekman-Westborg-Julin syndrome, Williams syndrome, and Nance Huran syndrome [16][17][18] .

II. CASE REPORT:

A 32 year old, male patient reported to the Department of Maxillofacial Surgery and General Dentistry at our medical college and general hospital, with a chief complaint of pain in the upper left front teeth region, since 2 weeks. On inquiring about the nature of pain, patient called it dull aching, and continuous in nature, which aggravated on chewing and incising food, suggestive of chronic pulpitis. No history of nocturnal pain was present. No significant pain relieving factors were presented by patient.

A sinus opening was present on the labial mucosa of 21, 22

Patient had no other systemic disease history and no history of any drug allergy. Vitals were normal.

On Intraoral examination, the Left Maxillary Central incisor was discoloured, and pain on percussion was positive. The tooth morphology had deep lingual pits, with accentuated cingulum, suggestive of a dental morphological anomaly. There was evident localised plaque deposition over the accentuated pit, predisposing the dens invaginatus to caries, cavitation and further pulpitis.

Extraoral examination revealed no significant findings.

Intraoral Radiographical investigations:

Radiographic evaluation of the central incisor revealed a deep infolding of enamel, extending throughout the Dentin and Pulp, suggestive of Dens invaginatus. The periapical area showed irregular radiolucency and apical PDL space widening.

Provisional Diagnosis:

Based on the physical examination, clinical findings and intraoral radiographic evaluation, a provisional diagnosis of chronic irreversible pulpitis associated in a tooth with a morphological anomaly of dens in dente, was made.

MANAGEMENT:

Non-surgical line of management (Root Canal Treatment) for the cariously involved central incisor was decided. Initial access preparation showed two orifices that were confirmed by mesially and distally angulated radiographs. The canals were prepared using hand and mechanical instrumentation after Zinc oxide eugenol dressing was placed for the periapical pathology. The patient was recalled at regular intervals to monitor the periapical pathosis, and the calcium hydroxide dressing was replaced. On further canal preparation, communication was seen resulting in one canal splitting into two in the apical region. Thorough biomechanical preparation with copious irrigation was done, to ensure maximal eradication of any foci of infection within the canal wall. After good healing of the periapical lesion was observed, obturation of the canals was done with gutta percha and post obturation composite restoration was placed. No specific treatment was required for the sinus tract opening on the labial mucosa of the incisor, as the tract would heal itself by granulation tissue formation and subsequent epithelialisation. The aesthetic concern of the patient was also addressed, by minimal tooth preparation, and post obturation, composite restoration.

III. DISCUSSION:

Although the etiology of Dens Invaginatus is still uncertain, it appears that both genetic and environmental components exist. During tooth development, tooth morphogenesis is affected by the ectomesenchymal signaling systems that occur between the dental papilla and the internal enamel epithelium (19). These signals have specific roles, such as the regulation of growth and the folding of the enamel organ (20). The absence of certain molecules can result in abnormally shaped teeth as well as in defects in the developing tooth

germ (21). For this reason, the proposal that genetic factors may be the cause of dens invaginatus has some credibility (22). Support for this possible cause also comes from one reported case of an individual lacking chromosome 7q32 who presented with dens invaginatus in addition to other dental abnormalities such as hypodontia (23). There is further support from a clinical study of 3,020 Swedish children that reported 2.7% of patients with dens invaginatus. Of the subjects in this study with the condition, 43% of their parents and 32% of siblings also had evidence of the abnormality (24). Additional evidence suggesting a genetic influence comes from the fact that the invaginations appear to have a limited variation and can occur in several teeth in the same individual or in siblings. There also appears to be an increased incidence of the condition in mongoloid groups and a lower incidence in negroid groups, and clustering of other genetically determined dental anomalies has been observed.

Dens invaginatus is seen on maxillary lateral incisors, maxillary central incisors, and maxillary canine teeth. Dens invaginatus in the mandible is extremely rare (25,26). The prevalence reported was the highest with the maxillary lateral incisors (80.3%) as the most frequently affected anterior teeth, followed by the maxillary central incisors (19.2%) and the maxillary canines (0.4%). (27)

The appearance of the symmetric dens invaginatus was considered to be a common finding by some authors. Bilateral appearance is not unusual and occurs in 43% of all cases (26). Bilateral occurrence was reported to be in conjunction with several dental anomalies, including taurodontism, microdontia, gemination, and dentinogenesis imperfecta.

In this case report, Dens Invaginatus was seen in Maxillary Central incisor, which was accidentally diagnosed radiographically.

Aetiology:

Over the last few decades, several proposals for theories to explain about the etiology of dens invaginatus, but it is still unclear:

1. Kronfeld suggested that the invagination results from a focal failure of growth of the internal enamel epithelium while the surrounding normal epithelium continues to proliferate and engulfs the static area.
2. Infection was considered to be responsible for the malformation by Fischer in 1936 and Sprawson in 1937.
3. Rushton [4] proposed that the invagination is a result of rapid and aggressive proliferation of a part of the internal enamel epithelium invading the dental papilla. He regarded this benign neoplasm of limited growth.
4. Oehlers [7] considered that distortion of the enamel organ during tooth development and subsequent protrusion of a part of the enamel organ will lead to the formation of an enamel-lined channel ending at the cingulum or occasionally at the incisal tip. The latter might be associated with irregular crown form.
5. Growth Pressure of the dental arch results in buckling of the enamel organ [5].
6. The "twin-theorie" suggested a fusion of two toothgerms [8].
7. Genetic factor cannot be excluded

Classification:

Most commonly used classification was proposed by Oehlers in 1957. He described the anomaly occurring in three forms (coronal invaginations);

Type I: An enamel-lined minor form occurring within the confines of the crown not extending beyond the cemento-enamel junction [1].

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 [1].

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 [1].

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 [12]

If the pulp becomes infected, saving the tooth may require a root canal. Teeth with dens in dente can also develop pulpitis or apical periodontitis if left untreated. Other potential complications include tooth displacement, abscess formation, internal resorption, and cyst development.

IV. Conclusion:

Treatment of dens in dente has phased into an endodontic approach from an extraction-oriented one, but with the advent of newer elaborate diagnostic tools. Clinically, microscopes have a massive contribution in the success of endodontic therapy not only in teeth with atypical morphology but also teeth with normal anatomy. Clinically, an invagination can be suspected whenever a dysmorphic anatomy of the tooth crown can be pointed

out, whereas a fortuitous discovery of the invagination can be made despite normal morphology of the tooth crown. Proper and specific obturation techniques should be used for each subtype of the Dens in Dente [13].

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Figure 1: Intraoral Examination



Figure 2: Diagnostic Pre-operative IOPAR

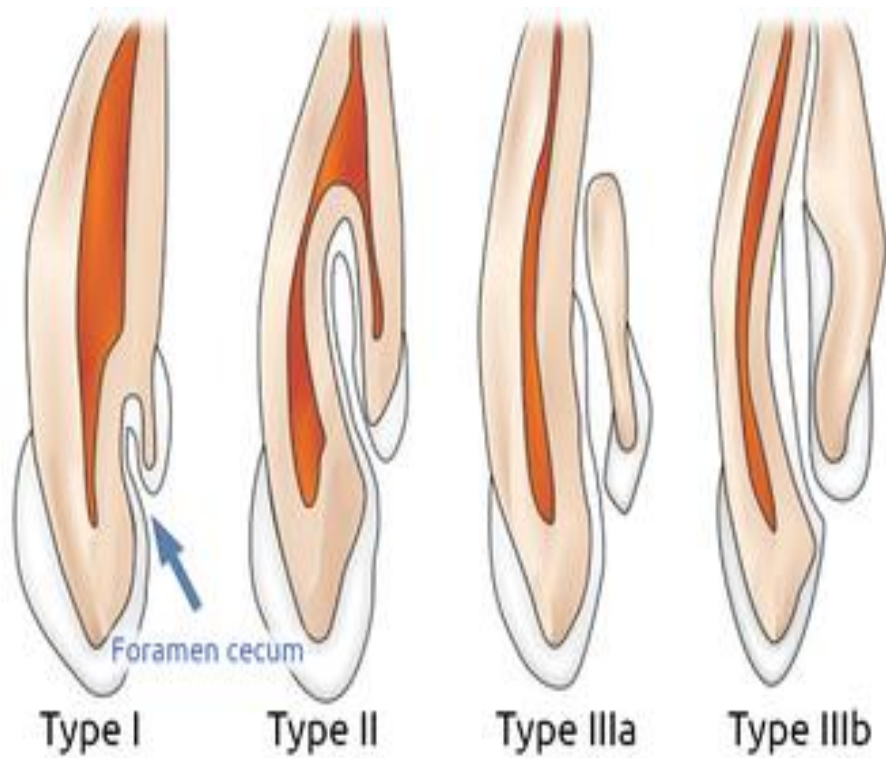


Figure 3: Oehlers Classification (1957)



Figure 4: Access Opening, Canal negotiation.



Figure 5: Master apical gutta percha cone IOPAR



Figure 6: Post Obturation IOPAR