Case Report

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2019;9:2:45-50.

Management of Maxillary Lateral Incisor with A Developmental Anomaly and A Large Periapical Lesion: A Case Report

Sadashiv Daokar[1] Laxmikant Late[2*] Kalpana Pawar[3] Kapil Wahane[4] Snehashree Pophli[5] Priya Kulkarni[6]

[1]Professor and Head, Department of Conservative Dentistry & Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.
[2]PG Student, Department of Conservative Dentistry & Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.
[3]Professor, Department of Conservative Dentistry & Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.
[4]Reader, Department of Conservative Dentistry & Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.
[5]PG Student, Department of Conservative Dentistry & Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.
[6]BDS, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.

ABSTRACT

Background: Developmental anomalies in the hard tissue are seen frequently in dental practice. Malformations of teeth with variations involving either the crown or the root or both are described as dental hard tissue anomalies. Developmental alterations in tooth shapes especially in esthetic zone, is a great challenge. Dens invaginatus is one of these anomalies, Dens in dente refers to a developmental anomaly associated with an abnormal infolding of the inner enamel epithelium into the dental papilla. In this case, we reported a combined therapy of type III dens invaginatus in a maxillary lateral incisor with a periapical lesion. The results obtained after two years of clinical and radiographic follow up demonstrated that combined endodontic and surgical treatment is a clinically viable alternative in cases of type III dens invaginatus. Tooth remained asymptomatic and functional. Radiographically, the healing of the lesion was observed.

Keywords: Developmental anomaly; Dens Invaginatus; maxillary lateral incisor; Periapical Lesion; Cone beam computed tomography; Endodontic Therapy; Periradicular Surgery.

INTRODUCTION

Developmental anomalies in the hard tissue are seen frequently in dental practice. Developmental dental disorders may be due to abnormalities in the differentiation of the dental lamina and the tooth germs (anomalies in number, size and shape) or to abnormalities in the formation of the dental hard tissues (anomalies in structure). In some, both stages of differentiation are abnormal. Developmental dental disorders are not only congenital but they may also be inherited, acquired or idiopathic.[1]

This case report documents an unusual case of dens invaginatus in maxillary lateral incisor. The abnormal structure of dens invaginatus (DI) in human teeth was first described by Socrates in 1856. Histologically, dens invaginatus can be defined as enamel organ deepening or invagination in dental papilla during the dental organ development process.[2] The prevalence of permanent teeth affected by DI is variable, ranging from 0.04%–10% and most commonly associated with maxillary lateral incisors (1.7% – 38.5%). It is more frequent in the maxilla than the mandible. Dens in dente have been reported to be associated with various syndromes such as Ekman–Westborg–Julin syndrome, Williams syndrome, and Nance Huran syndrome.[3]

The invagination ranges from a slight pitting (coronal type) to an anomaly occupying most of the crown and root (radicular type). While the coronal

Received: Nov. 7, 2018**: Accepted**: Jan. 19, 2019
***Correspondence Dr. Laxmikant Late.**
Department of Conservative Dentistry & Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.
Email: laxmikant.late87@gmail.com

pISSN 2278-0076
eISSN 2321-9270

type of invagination is lined with enamel, the radicular type of invagination is lined with cementum. A clinical examination reveals a deep fissure or pit on the lingual surface of an anterior teeth and an occlusal pit on the posterior teeth.[4] It is also called as 'dens invaginatus' or 'dilated composite odontome'. Dens invaginatus is commonly diagnosed as an incidental radiographic finding unless the patient presents with pain or swelling associated with the involved tooth.[5]

Aetiology of DI is unclear. However, there are several theories:

-Infection
-Trauma
-Growth pressure of the dental arches during odontogenesis
-Rapid proliferation of the internal enamel epithelium invades the underlying dental papilla.[6]

Based on the location and extent of invagination, the anomaly can be divided into coronal and radicular types.

Oehler classified dens invaginatus into three distinct types according to the depth of invagination and its communication with the periodontal ligament or periapical tissues.

Type I is an enamel-lined minor invagination confined to the crown without extending beyond the cemento-enamel junction.

Type II describes the extension of the invagination into the root, beyond the cemento-enamel junction ending in a blind sac. Some type II cases may communicate with the dental pulp.

Type III : A severe form that extends from the root and opens into the periodontium. It is further divided into two sub-types:

a: An invagination that runs into the root, and communicates laterally with the periodontal ligament, without pulpal involvement.

b: An invagination into the root that communicates with the periodontal ligament at the apical foramen, which is usually lined usually by enamel and rarely by cementum.[7]

The purpose of this paper was to present a clinical case of **type IIIb Dens Invaginatus,** identified on the maxillary left lateral incisor with a large periapical lesion treated combined with endodontic and surgical treatment.

CASE REPORT

A 34-year-old male patient reported to the department of Conservative-Dentistry and Endodontics, with the chief complaint of pain & swelling in the upper front region of the jaw. Medical and family history was noncontributory. The patient reported no history of systemic diseases. There was no history of trauma and no past dental history. On clinical examination extra-oral swelling seen on the left front side of the face. Intra-orally swelling seen on the labial gingiva of 21,22 & 23. A sinus tract opened in the facial gingiva in relation to tooth no. 22. There was pus discharge from this sinus tract. Yellowish discoloration seen with tooth no. 22 and the crown was larger mesio-distally than the contralateral tooth. (Fig. 1) Crown appeared to be intact and caries free. Tenderness on percussion or palpation was noted with 21, 22, 23. The pulp vitality test was done and tooth number 22 gave a negative response.

On radiographic examination IOPA & OPG (Fig. 2&3) revealed altered tooth morphology and showed that the tooth was invaginated till the apical third of the root. This led us to diagnose the tooth as type III dens invaginatus involving the tooth number 22 & a large periapical radiolucency extending from tooth number 21 to 23. There was a mesially directed radiopaque enamel lined tract, which is related to the periapical radiolucency. Enamel lined tract was separated from the main root canal. Due to aberrant anatomic structure and a periapical radiolucency of the tooth, for better understanding of crown-root moephology, CBCT scan was performed to confirm the diagnosis as dens invaginatus Type IIIb. (Fig. 4) CBCT images showed that the invagination extended from the crown to apex & the root canal was separated by the DI.

Based on the clinical and radiographic finding, presence of Type III dens in dente was confirmed and a definite treatment plan was formulated. Treatment started with conventional endodontic procedure. Considering the extent of the lesion, root

canal treatment was started in all the three teeth under rubber dam isolation. Access opening was first initiated on tooth number 22 and a wide mesiodistal oval shaped cavity was made using no-2 round bur (Mani, Japan). With the aid of DG-16 endodontic explorer (Maillefer, Switzerland) three orifices were detected (Fig. 5) and their patency was ascertained using No-10 K file (Mani, Japan). No communication was observed between the main canal and invagination. All the three root canals in this tooth were separate from each other throughout its length.

The orifices were enlarged at the coronal and middle third using Gates-Glidden drills no. 1 and 2 (Mani, Japan). Canals were irrigated with 5% sodium hypochlorite (Vishal dentocare pvt. ltd., India), 17%EDTA (Endo-L maarc, India) and finally rinsed with 0.9% saline (NS Infutec healthcare ltd., India). The working length of main canal and invagination was determined using apex locator (Root ZX, J Morita, Japan) and confirmed with radiograph. They were enlarged using step back technique. The canals were dried with sterile paper points (Dentsply, Maillefer) and calcium hydroxide (Calcicur; VOCO, Cuxhaven, Germany) was placed as the intracanal medicament. Simultaneously access opening was done on tooth numbers 21 and 23, working length established cleaned and shaped, the intracanal medicament (Calcium hydroxide, RC-Cal) placed and the access cavity was sealed. At the second appointment, the sinus tract was found to be healed and there was no swelling. Calcium hydroxide dressing was replaced. In the next appointment obturation was done with 22. (Fig. 6) Simultaneously root canal treatment completed with 21 & 23.

Surgical treatment was performed because the patient still had an apical infection after root canal treatment and the periapical lesion was not fully healed. For the surgical approach, after administration of local anesthesia using articaine with 1:10000 epinephrine, a labial full thickness triangular mucoperiosteal flap was elevated to expose the pathological area, bone window was widened using a surgical bur. The granulomatous soft tissue around the root apex was curetted with surgical curettes. The root ends were resected 2 mm from the apex using a fissure bur, and the fragile margins were also removed. The surgical region was irrigated with normal saline 0.9% and dried. Lastly, the flap was repositioned and sutured with a 5-0 polypropylene suture (Holycon, Jiangsu, China). The patient was prescribed antibiotics and a mouthwash. The final restoration of the tooth was done and then patient was reviewed for clinical and radiological signs of healing after 6 month and 1 year. The patient was asymptomatic and did not have any recurrence of symptoms in the affected tooth.

Fig 1: Yellowish discoloration with 22, 22 was larger mesio-distally than 12.

Fig 2: IOPA showing dens invaginatus.

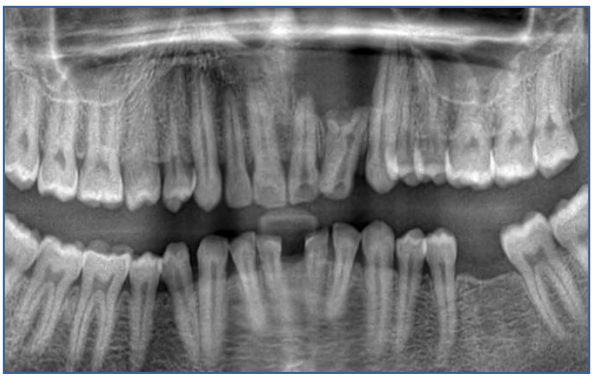

Fig 3: OPG showing dens invaginatus Type IIIb with Periapical lesion

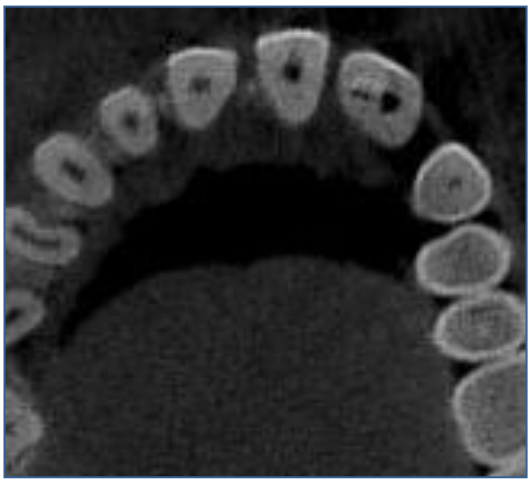

Fig 4: CBCT showing dens invaginatus Type IIIb with Periapical lesion.

Fig 5: Three canals orifices.

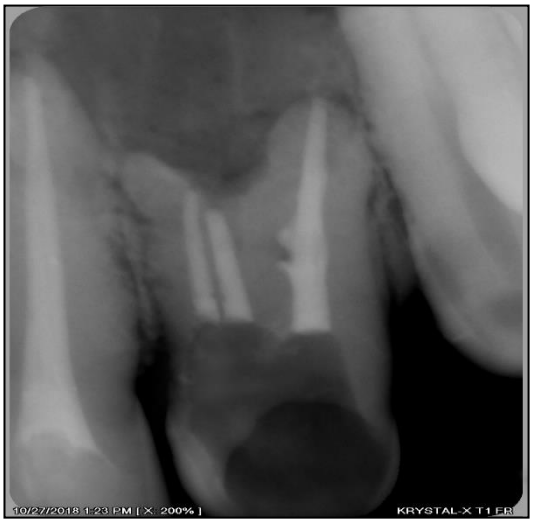

Fig 6: Post Obturation IOPA.

DISCUSSION

Endodontic management of dens invaginatus is challenging because of the complex anatomy and canal morphology. Dens invaginatus in a maxillary lateral incisor is quite common, Most of these cases presented a type 3 invagination, as was found in our case, here we present a unique maze of dens invaginatus with multiple canals and a large periapical lesion. Type 3 dens invaginatus often has communication with the oral cavity, allowing irritants and microorganisms to enter the pulpal cavity because the intervening enamel and dentin are frequently thin or hypoplastic.[8] There may be intercommunicating channels between the invagination and the pulp. These are responsible for necrosis of the pulpal tissue and result in the development of periapical lesions soon after the tooth eruption,[9] Type 3b dens invaginatus is hard to ascertain and operate because it is overlaid and surrounded by the root canal system opening apically into the periodontium.[10]

Development of an invaginated tooth has been explained based on a number of hypotheses, there was an abnormal proliferation of enamel organ invading the dental pulp (Oehlers, 1957). However, some authors also considered the invagination to be a deep infolding of the apical foramen during odontogenesis, resulting in some cases, a second apical foramen (Schulze C, 1970). The most significant clinical concern of dens invaginatus is the risk of developing pulpal pathology. Sometimes fine canals extend between the invagination and the pulp chamber, resulting in pulpal and periapical pathology even in the absence of dental caries.[11]

Periapical radiographs are limited in revealing the type, extension, and complex morphology of dens invaginatus, as well as, the actual bone loss when compared to tomographic techniques. Cone-beam computed tomography (CBCT) is a useful tool for the management of complex endodontic problems and useful in assessing the true nature of the invagination, in particular, the relationship of the invagination with the root canal.[12] Several treatment modalities have been described such as preventive restoration, nonsurgical endodontic treatment, surgical treatment, extraction of dens invaginatus, intentional replantation, and extraction of the tooth.[13]

A nonsurgical approach should be considered before any surgical procedure. However, a combination of a nonsurgical and surgical approach was chosen in this case because, the periapical lesion was incompletely healed, combined treatment was the best plan for this patient, considering his periapical lesion. Moreover, surgical treatment provided effective healing and a good prognosis. Calcium hydroxide, used as an inter - appointment dressing in the root canals, helped in healing the periapical infection and disinfecting the root canals.

Researchers suggested that pulp necrosis and periradicular pathosis may occur in permanent incisors with abnormal crown or incisors with root groove defect.[14] Bhatt and Dholakia claimed that the radicular invagination usually results from an enfolding of Hertwig's root sheath and originates within the root after development is complete.[15] In types I and II, the invagination can be removed, thus transforming the tooth into a single canal followed by conventional treatment.[16] The challenge becomes greater in type III cases, where the anatomy is more complex. The success of the root canal treatment in these teeth depends on identifying all the additional canals and restoring the same. At the 6 months and 1-year postoperative recall examination, the tooth was asymptomatic and radiographically showed signs of healing.

CONCLUSION

Type III dens invaginatus is a rare occurrence. Careful preoperative radiographic evaluation, a thorough knowledge of anatomical changes and correct treatment procedure are necessary for success of the treatment. Successful treatment of an endodontically involved tooth should make it functional and aesthetically acceptable for the patient.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Pindborg JJ. Pathology of the dental hard tissues. 1970.

2. J. D. P´ecora, M. D. Sousa-Neto, T. C. Santos, and P. C. Saquy, "In vitro study of the incidence of radicular grooves in maxillary incisors," Brazilian Dental Journal 1991;2:69-73.

3. N Sisodia, MK Manjunath, Double Dens In Dente: A rare anomaly. SADJ 2016;71:410-11.

4. A. P. Bhatt and H. M. Dholakia, "A radicular variety of double dens invaginatus," Oral Surgery OralMedicine and Oral Pathology 1975;39:284-87.

5. Balagopal Sundaresan , Arathi Ganesh , Nivedha Rajendran TOOTH WITHIN A TOOTH Sri Ramachandra Journal of Medicine 2007;1:47-49.

6. Hulsmann M. Dens invaginatus: aetiology, classification, prevalence, diagnosis, and treatment considerations. Int Endod J.1997;30:79-90.

7. Oehlers FA. Dens invaginatus (dilated composite odontome). I. Variations of the invagination process and associated anterior crown forms. Oral Surg Oral Med Oral Pathol 1957;10:1204-18.

8. Tsurumachi T. Endodontic treatment of an invaginated maxillary lateral incisor with a periradicular lesion and a healthy pulp. Int Endod J 2004;37:717-23.

9. Chen YH, Tseng CC, Harn WM. Dens invaginatus. Review of formation and morphology with 2 case reports. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1998;86:347-52.

10. Alani A. Dens invaginatus, a problem from the outside in. Int Dent J 2009;59:343-48.

11. White, SC.; Pharoah, MJ. Dental anomalies, oral radiology. In: Principles and interpretation. 5th ed. Mosby: Elsevier, 2004:340-42.

12. Patel S. The use of cone beam computed tomography in the conservative management of dens invaginatus: A case report. Int Endod J 2010;43:707-13.

13. de Sousa SM, Bramante CM. Dens invaginatus: treatment choices. Endod Dent Traumatol. 1998;14:152-58.

14. Cecilia MS, Lara VS, de Moraes IG. The palato-gingival groove. A cause of failure in root canal

treatment. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1998;85:94-98.

15. A. P. Bhatt and H. M. Dholakia, "A radicular variety of double dens invaginatus," Oral Surgery OralMedicine and Oral Pathology 1975;39:284-287.

16. Kristoffersen, O. H. Nag, and I. Fristad, "Dens invaginatus and treatment options based on a classification system: report of a type II invagination," International Endodontic Journal 2008;41:702-09.