

Non-Surgical Management of Apical Root Resorption of Maxillary Lateral Incisor with Dens in Dente - A Case Report

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DOI: <https://doi.org/10.52403/ijhsr.20230213>

ABSTRACT

Dens in dente is a developmental anomaly which occurs as a consequence of invagination of external tooth surface of crown before the calcification is complete. Complexity of dens in dente ranges from invagination within the limit of cement-enamel junction to that penetrates through the root perforating at the apical area showing a 'second foramen' in the apical or periodontal area. Because of the bizarre root canal anatomy and associated peri apical pathology; the management of such teeth might end up with combination of endodontic-surgical intervention or extraction. This article describes the non surgical endodontic management of maxillary left lateral incisor with dens in dente, apical root resorption and periapical cyst.

Keywords: Dens in dente, Dens invagination, Root resorption, Biodentine

INTRODUCTION

Dens in dente or dens invaginatus(DI) is a developmental anomaly results as a consequence of invagination of external tooth surface of crown before the calcification is complete.(1) It is also known as dilated composite odontome and it most commonly found in maxillary lateral incisor. Classification of dens invagination given by Oehler in 1955 includes(Fig 1A); three types according to the depth of invagination and communication with periodontal ligament or periradicular tissues.(2) The invagination into the tooth act as a pathway for microbes and other irritants to the pulp, leading to dental caries and peri radicular lesions in advanced stages. Because of the bizarre root canal anatomy and associated peri apical pathology, "blunder- buss" open apices in immature tooth further complicates the treatment strategies, and the management of

such teeth might end up with surgical, combination of endodontic-surgical intervention or extraction.

Clinically DI is asymptomatic with abnormal crown anatomy and the patient usually complains of increase in dimension of crown either mesially/distally/labially/palatally or presence of an abnormal prominence in the palatal aspect/occlusal surface of the crown.(3) Adjunctive radiographic examination reveals the degree of invagination.

Sometimes patients may present with symptoms of irreversible pulpitis, apical periodontitis or much chronic forms of peri apical pathologies which might be an abscess or cyst. There might not be an obvious history of trauma, dental caries or any other particular etiology for peri radicular pathogenesis. This article describes the non surgical endodontic management of maxillary left lateral incisor

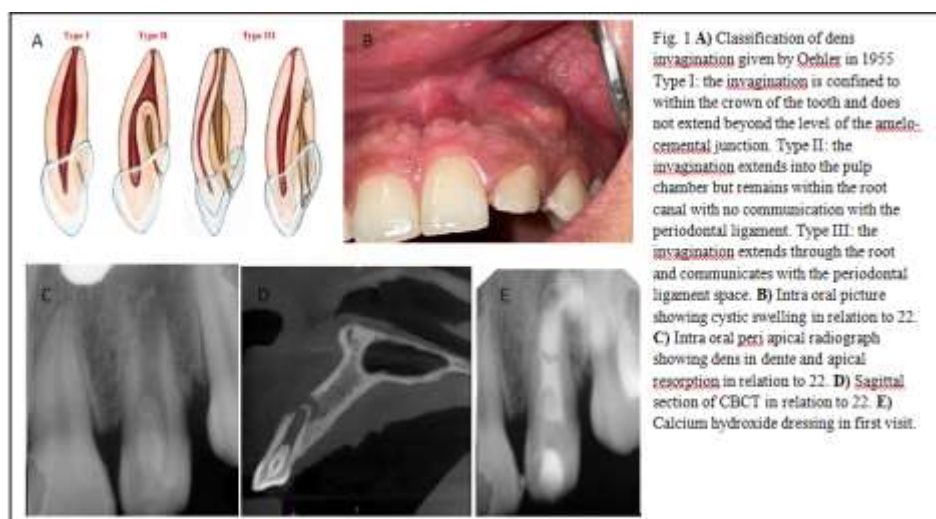
with dens in dente, apical root resorption and periapical cyst.

CASE REPORT

A twenty seven years old female patient reported to the department of conservative dentistry and endodontics with the chief complaint of painful swelling in upper left front tooth region since seven months. Moderate continuous pain and swelling was present in relation to 22(FDI tooth numbering system). Patient informed that the swelling was smaller initially; later it started to grow without pus discharge or sinus tract. The patient didn't take any dental treatment for the swelling for the past seven months but was taking analgesics whenever pain increases, without doctor's consultation. Now the patient reported to the OPD for dental care.

Medical history was not contributory. Clinical examination showed; soft, fluctuant, translucent swelling in relation to facial attached gingival of 22. Crown of 22 was yellowish discoloured with tenderness to percussion. Palatal surface of the crown

of 22 showed slight prominence near the cingulum. Thermal and electric pulp tests were negative. Intra oral periapical radiograph showed ill defined periapical radiolucency, resorption of root apex in relation to 22. Abnormally widened root canal with minimum thickness of dentin was present both mesial and distal aspect of root canal. An intra-odontic radiopaque mass of size 7 * 2mm was extending from cemento-enamel junction to the middle third of the root. A narrow radiolucent channel was present inside this radiopacity, which did not have communication with the main root canal or periodontal ligament. A CBCT is advised for confirmatory diagnosis. Sagittal section of CBCT in relation to peri apex of 22 showed well defined radiolucency with sclerotic border suggesting peri apical cyst and irregular borders of root apex indicating apical root resorption. Radiopaque mass inside the tooth was confirmed as dens invaginatus and it didn't had communication with main root canal. Confirmatory diagnosis was chronic peri apical cyst with type II dens in dente.



Management

As a minimal invasive procedure; non surgical endodontic treatment was the preferred treatment option. After obtaining the consent from the patient, access opening was done in relation to 22. DI was removed completely with round end tapered fissure diamond bur (Mani, Inc.8-3 Kiyohara

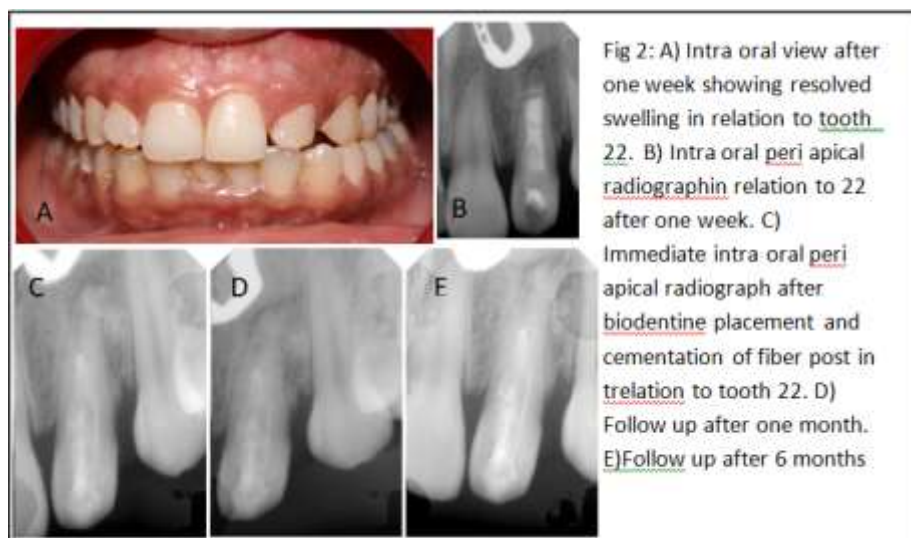
Industrial ParkUtsunomiya, Tochigi 321-3231 Japan) and the patency of the canal established. Working length determined radiographically. Initial apical file size was number 70 K file. Minimal mechanical preparation of the canal was completed with hand K-file (Mani, Inc.8-3 Kiyohara Industrial ParkUtsunomiya, Tochigi 321-

3231 Japan). EDTA 17% and 5.25% sodium hypochlorite used as root canal irrigants. Calcium hydroxide was given as an intra canal medicament and temporary restoration done with Cavit (3 M ESPE, St Paul, MN, USA).

After one week, the patient was recalled again and temporary restoration removed under rubber dam. Irrigation was done with 5.25% sodium hypochlorite, normal saline, 2% chlorhexidine and normal saline sequentially. Root canal was dried with paper points. Biodentine (Septodont, St. Maur.des.Fosses, France) was prepared as per manufacturer instructions and placed inside the canal using a micro apical carrier. Biodentine was condensed into the root apex using hand plugger and intra oral radiograph was taken to confirm the apical seal. Paper points were used to remove the remnants of Biodentine from the root canal walls and the material allowed to set.

Later selective etching (Mani Bond Selective etch bond, 7th generation, Mani Inc.8-3 Kiyohara Industrial Park Utsunomiya, Tochigi 321-3231 Japan) of the root canal was done and glass fiber post (Mailyard fiber post, India) of diameter 1.2mm cemented inside the root canal with dual cure flowable composite (Fusion core DC flo, Prevest DenPro, USA) and access cavity restored with composite (Kulzer Charisma smart composite, Heraeus Kulzer, USA). Intra oral peri apical radiograph was taken to confirm the post cementation and permanent restoration.

The patient was recalled at regular intervals of 1, 3 and 6 months to monitor the peri apical pathosis. Within six months post treatment the patient was completely asymptomatic and intra oral peri apical radiograph showed healed peri apical area in relation to 22.



DISCUSSION

Management of tooth with DI is complicated because of its abnormal canal morphology; especially in DI type III. In case of DI type I & II, endodontic management can be simplified by removing the invagination in total. But in case of type III, in which DI has communication with the periodontal ligament through lateral foramen or apical foramen the management becomes challenging. In such cases

combined endodontic and surgical intervention might be required. In the present case, the DI is within the root canal confines and didn't have any communication with periodontal ligament space. So that the DI was removed completely to attain patency of the canal. But the thin root canal dentin, apical root resorption and large peri apical pathosis questions the prognosis.

The placement of calcium hydroxide for one week reduces the microbial count and helps the tissues to recover and heal.(4) In the current case also; one week placement of calcium hydroxide as an intra canal medicament reduced the swelling, pain and the patient became asymptomatic. It is a sign of reduced bacterial load and positive response to tissue healing. Repair of apical resorption was done with bioactive material, Biodentine. Biodentine (Septodont, Saint-Maur-des-Fosses, France) is a tricalcium silicate-based restorative material that has been introduced. Calcium chloride in the liquid which reduces the setting time.(5) Biocompatibility, bioactivity and biomineralization properties makes the Biodentine suitable material for resorption repair.(6) Comparing and evaluating the microleakage and compressive strength of Fuji II LC, Riva light cure, Pro- Root white mineral trioxide aggregate (MTA), Biodentine , and Well-Root PT, Biodentine showed the least microleakage and good compressive strength of all five materials and satisfied the international requirements. (7) Repairing resorptive root apex with Biodentine might prevent further resorptive process because of its bioactive properties.(8) At the same time Biodentine shows similar compressive strength of natural dentine.(9) Biodentine along with fiber post showed enhanced fracture resistance in simulated immature roots under aging conditions when compared with different canal-filling materials and entire root canal filled with Biodentine alone.(10) In the current case the thin root canal dentin is reinforced by fiber post and flowable dual cure resin composite was used as adhesive, which is expected to increase the structural stability of tooth structure. At the same time the reduced radiopacity of Biodentine is the limiting factor compared to other calcium silicate cements because of zirconium oxide as a radiopacifier.(11) The three dimensional sealing of Biodentine cannot be appreciated from two dimensional radiographs like IOPA, in such conditions CBCT imaging assures adequate

confirmation.(12) Surgical resection of root apex with curettage of peri apical lesion followed by retrograde filling of a bioactive restorative material is an alternative option for management of DI.(3)

CONCLUSION

Management of dens invaginatus has progressed from extraction-oriented phase to a minimally invasive non surgical endodontic phase because of advancements in diagnostic tools and restorative material. Repair of apical resorption with Biodentine inhibits the resorptive process and is expected to stimulate hard tissue formation. Reinforcing the weakened tooth structure with fiber post is expected to increase the longevity of tooth. Finally, future research is needed to device more biocompatible materials with adhesive, reinforcing and esthetic properties for managing tooth with dens invaginatus.

Declaration by Authors

Acknowledgement: Sincere thanks to department of conservative dentistry and endodontics, Government College of dentistry, Indore, Madhya Pradesh, India.

Source of Funding: None

Conflict of Interest: No potential conflict of interest relevant to this article was reported

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How to cite this article: Geo T D, Saurabh Gupta, Payal Saxena et.al. Non-Surgical management of apical root resorption of maxillary lateral incisor with dens in dente- a case report. *Int J Health Sci Res*. 2023; 13(2):80-84.
DOI: <https://doi.org/10.52403/ijhsr.20230213>
