

Non Surgical Root Canal Treatment of Type II Dens Invaginatus with Internal Root Resorption- A Case Report

¹A. Karthick, ²JaiKailash, ²M. Kavitha and ¹D. Malarvizhi

¹Department of Conservative Dentistry & Endodontics,
Sree Balaji Dental College & Hospital, Bharath University, Chennai, India
²Tamilnadu Government Dental College, Chennai, India

Abstract: Endodontic management of teeth with dens invaginatus is complicated and challenging due to its complex internal anatomy. Due to the bizarre root canal anatomy, combination of non surgical and surgical endodontic treatment or extraction is the treatment of choice. This article describes a case report of non surgical endodontic treatment for type II dens invaginatus with internal root resorption.

Key words: Dens Invaginatus • Root Resorption • Calcium Hydroxide and Iodoform Paste • Non Surgical Root Canal Treatment.

INTRODUCTION

Dens invaginatus (Dens in dente or dilated composite odontoma or gestant odontoma) is a developmental malformation resulting from in-folding of the surface of the tooth crown or root before calcification has occurred. The etiology is controversial and remains unclear but has been related either to focal growth retardation or focal growth stimulation or to localized external pressure in certain area of tooth bud [1]. The prevalence ranges from 0.04-10% with maxillary lateral incisor the most commonly affected tooth followed by central incisors, premolars, canines and molars. Bilateral occurrence is not uncommon and occurs in 43% of all cases [2].

Most commonly accepted classification of dens invaginatus was given by Oehlers [3], which is based on depth of penetration and communication with periapical tissues or periodontal ligament.

Type I: Enamel-lined minor invagination occurring within the confines of crown not exceeding beyond cement-enamel junction.

Type II: Enamel lined form that invades the root, but remains as a blind sac and connection between invagination and pulp is possible.

Type III: Invagination penetrates through root, perforating the apical area and forming a second foramen in the apical area or periodontal area without communication with the pulp.

Dens invaginatus is detected only by chance on the radiograph. Unusual clinical crown morphology may give a hint about its existence. Usually thin canals or fissure connects the invaginated portion to the pulp and act as a pathway for the irritants and microorganisms from the oral cavity to reach the pulp before caries development [4].

Case Report: A healthy 14- year old boy was referred to the Department of Conservative dentistry and Endodontics, Tamilnadu Government Dental College and Hospital, Chennai with a history of pain and swelling in his maxillary left anterior region for the past 1 week. History revealed an episode of trauma to the maxillary left lateral incisor 6 months back. Patient reported throbbing pain and an intra oral swelling over the past two days with no previous history of discomfort. No abnormality detected on extra oral examination.

Intra oral inspection revealed an abscess on the labial aspect in relation to maxillary left lateral incisor which was peg shaped [Fig 1]. Tenderness on percussion was positive and no response on electric pulp testing. Periodontal probing revealed a normal and intact



Fig. 1: Preoperative photograph reveals abscess in relation to 22



Fig. 2: Diagnostic radiograph reveals dens invaginatus with internal resorption and periapical pathosis in relation to 22

periodontium in relation to the peg shaped lateral incisor. The adjacent teeth and contra-lateral teeth were normal.

Intra oral periapical radiograph reveals a peg shaped lateral incisor with a dens invaginatus extending from crown upto the middle third of the root [Fig 2]. The apical one third of the root revealed an area of internal resorption of the root canal and an associated radiolucency in the mesial surface of lateral incisor extending from middle third to the apex. Pulp space was patent to the entire length. The contra-lateral tooth was also cross checked for clinical and radiographic signs of same abnormality but there was none.

Correlating the clinical and radiological findings the diagnosis was an acute periapical abscess with internal root resorption in peg shaped maxillary left lateral incisor associated with a type II dens invaginatus.

Treatment: Endodontic management was the first line of treatment as the size of the resorptive defect apical to the invagination was greater than the orifice opening.



Fig. 3: After obturation

It posed a difficulty for the canal preparation and final filling of the pulp space. Root canal access was prepared and the canal orifice was located. Initial path finder file stepped short of the canal length as determined from the preoperative radiograph. A radiograph was taken to confirm the position of the file and it revealed the file did not go beyond the apex of the invaginated portion. On further probing with a combination of EDTA (Glyde) the file penetrated the apex of invagination and a direct communication with the primary root canal was established. A radiograph was taken to confirm the exact working length.

Cleaning and shaping was done carefully in order not to weaken the root structure. Rotary PROTAPER (Dentsply) instrumentation was done to enlarge the canal space to F2 size, up to the dens invaginatus which ensured a smooth preparation of the canal walls. The apical third of the primary canal was hand instrumented upto ISO file size of 40 under copious irrigation.

After the canal space preparation, a flowable obturation technique could be an ideal choice because of the narrow entry to the wider resorptive lesion. Hence a syringable material of calcium hydroxide and iodoform (METAPEX) was syringed inside from the apical region and backfilled in the canal space up to the coronal orifice. An immediate radiograph confirmed a smooth flow of the material in the canal space and also revealed a spill of the material in the periapical radiolucent area and a lateral spill was also noted. Further gutta percha points were filled in the canal space to obtain a fluid tight filling by lateral condensation with the syringed calcium hydroxide as the sealer. A radiograph was taken confirming a dense obturation of the canal [Fig 3] and orifice was sealed with Cavit, a temporary filling material.

The patient was recalled after 2 weeks for review. Patient was asymptomatic and clinical examination revealed complete absence of the intra oral swelling



Fig. 4 2: Wks post op photograph reveals disappearance of the abscess



Fig. 7 6: Months post op IOPA



Fig. 5 2: wk post op IOPA reveals gradual reduction in the size of the periapical lesion



Fig. 8 1: yr post op photograph



Fig. 9 1: yr post op IOPA reveals intact lamina dura and periodontal ligmanet space



Fig. 6 3: Months post op IOPA reveals complete disappearance of the periapical lesion

[Fig 4]. Radiograph revealed the filling in the canal space intact but the spill in the periapical areas was resorbed and lateral spill posed to be a lateral canal bad also resorbed indicating the material had not been in a lateral canal but rather a free space where it has resorbed



Fig. 10 4: yr post op photograph with metal ceramic crown



Fig. 11 4: yr post op IOPA

suggesting the resorptive lesion has had an external communication making it a combined defect [Fig 5]. Temporary filling was removed and the access was sealed with glass ionomer cement. Peg shaped lateral incisor was build up with light cure composite resin. Patient was recalled after 6wks, 3 months, 1 yr and 4 years [Fig 6-11]. Six weeks recall radiograph revealed a considerable reduction and disappearance of the radiolucency around the root surface in the periapical area suggestive of good healing. At fourth year follow up, patient remained asymptomatic. Metal ceramic crown was fabricated and luted with type I glass ionomer cement.

DISCUSSION

Clinician should be aware of the incidence and methods for treating dens invaginatus. Failure to locate, debride and obturate complex root canal spaces will lead to failure. Reported treatment options for dens invaginatus includes preventive restorative treatment, root canal treatment, combined root canal and surgical treatment, intentional replantation and extraction[5,6]. According to Oehlers classification, the present case was a type II dens invaginatus as the invagination was confined within the root as a blind sac. Type II invaginations are difficult to treat, as the invagination prevents access to perform adequate cleaning and shaping. In the present case, the invagination appeared to communicate with the pulp and clinical exploration during root canal treatment confirmed this. Therefore the etiology of the periapical pathosis in this case was due to the infected primary root canal. Mechanical debridement of primary root canal was difficult but combination of instrumentation, filling the canal with calcium hydroxide and gutta percha has proved sufficient without resorting to surgery. As calcium hydroxide has been reported to

have antibacterial activity [7-11] and has the ability to repair perforation, it was decided to fill the root canal with this medicament (METAPEX) as sealer [9,10] and lateral condensation with gutta percha without generating heavy condensation pressure.

The above mentioned case illustrated that even in a tooth with dens invaginatus, periapical lesion and internal resorption, non surgical endodontic treatment without surgical intervention can result in satisfactory periradicular healing. A four year post operative radiograph has revealed the validity of the line of treatment.

CONCLUSION

For a successful endodontic treatment, dentists should be aware of variations in morphology of pulp cavity. Despite the complex anatomy and diagnosis of dens invaginatus, non surgical root canal treatment was performed successfully.

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