

Management of a rare case of Class II double dens invaginatus in a maxillary lateral incisor

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doi: <http://dx.doi.org/10.1590/2178-3713.4.2.079-082.oar>

ABSTRACT

Introduction: *Dens invaginatus* is a developmental malformation resulting from invagination of tooth crown or root before calcification and during odontogenesis. It is a critical condition for which endodontic treatment is essential, as it frequently presents a complex internal anatomy. Double *dens invaginatus* is an extremely rare condition. **Objective:** The present study reports a rare

case of double *dens invaginatus* with large periapical lesion. **Methods:** Non-surgical endodontic treatment was carried out. **Results:** One year after treatment, clinical examination revealed asymptomatic teeth, while radiograph examination showed healing of the periapical lesion.

Keywords: Tooth abnormalities. *Dens in dente*. Root canal treatment.

How to cite this article: Silva EJNL, Oliveira SG, Zaia AA. Management of a rare case of Class II double dens invaginatus in a maxillary lateral incisor. *Dental Press Endod.* 2014 May-Aug;4(2):79-82. DOI: <http://dx.doi.org/10.1590/2178-3713.4.2.079-082.oar>

» The authors report no commercial, proprietary or financial interest in the products or companies described in this article.

» Patients displayed in this article previously approved the use of their facial and intraoral photographs

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Submitted: January 18, 2014. Revised and accepted: January 21, 2014.

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Introduction

Dens in dente, also known as *Dens in dens* or *Dens invaginatus (DI)*, is a developmental anomaly resulting from invagination of the enamel organ into the dental papilla. It begins at the crown and sometimes extends to the root before calcification occurs.¹ The incidence of this anomaly is reported to range from 0.04% to 10.00%. It commonly occurs in maxillary permanent lateral incisors followed by maxillary central incisors, premolars, canines and less often in molars.^{1,2} *Dens invaginatus* are classified according to their severity, and the most commonly accepted classification was developed by Oehlers³ who described three types of DI for anterior teeth: type I, invagination confined within the crown; type II, invagination invading the root as a blind sac, with possible connection to the dental pulp; and, type III, invagination penetrating through the root and extending to the apical region.

Teeth affected by *dens invaginatus* are associated with a high risk of pulp disease and consequent sequelae — i.e., pulp necrosis and apical periodontitis — because invagination allows bacterial and irritants to enter and potentially communicate directly with the pulp space and/or through a thin enamel and dentin layer that may be developmentally deficient. Additionally, type III lesion may also cause apical periodontitis without pulp involvement.⁴ Dental treatment is often required because invagination allows access of irritants into the pulp space or into an area connected to periradicular tissues.⁵ Several techniques for treatment of teeth with *dens invaginatus* have been reported in the literature, namely: non-surgical endodontic therapy, endodontic surgery and extraction.^{4,5,6} Treatment success may still be greatly dependent on the internal morphology of the affected tooth which is highly variable and may be difficult to recognize under clinical settings.⁴

Double *dens invaginatus* is an extremely rare dental anomaly involving two enamel lined invaginations presented in a tooth. The present study reports

a case of endodontic treatment of a maxillary lateral incisor with double *dens invaginatus* associated with periradicular lesion.

Case report

A 15-year-old female patient with a noncontributory medical history was referred by her dentist to endodontic treatment of right maxillary lateral incisor. The tooth was slightly sensitive to percussion and palpation and failed to respond to electric pulp testing. Adjacent teeth, however, responded within normal limits. Soft tissues around the tooth were free of pathologic signs. Radiographic examination revealed large periapical radiolucency around the apex of the affected tooth and complex canal anatomy with a type II double *dens invaginatus*. Previous endodontic access was performed in the tooth (Fig 1A). The root of the tooth was fully formed. The patient was diagnosed with type II double *dens invaginatus* with associated periapical lesion secondary to pulp necrosis.

After local anesthesia with 2% lidocaine and 1:100,000 epinephrine, a new access cavity was performed with diamond burs in high speed rotation and a rubber dam so as to remove the two invaginations. They were removed with a view to provide access cavity with magnification and illumination. After invaginations removal, the root canal was prepared with Gates-Gliden burs and endodontic manual files. A 5.25% sodium hypochlorite solution was used for irrigation and renewed at each change of instrument. After complete chemomechanical preparation, the root canal was dried with sterile paper points and filled with Endomethasone N™ cement (Septodont, France) by means of the thermoplastic technique. The access opening was then sealed with a temporary filling. One year after treatment onset, the patient was asymptomatic and did not report postoperative pain. Periapical radiograph examination revealed periapical healing (Fig 1B).



Figure 1. **A)** Periapical radiograph showing a maxillary right lateral incisor with double *dens invaginatus*. The arrows show the invaginations. **B)** Follow-up radiograph after 12 months showing periapical healing.

Discussion

Dens invaginatus is an anomaly of dental development that may precipitate a connection of the pulp space with the oral cavity. As a result, it is common that affected teeth require endodontic treatment which is often complicated due to teeth complex anatomy. Despite being a common anomaly, only a few cases of double *dens invaginatus* have been reported.^{7,8} According to Mupparapu et al,⁹ only nine cases of double *dens invaginatus* are described in the literature. The present article reported and discussed the endodontic treatment of a maxillary lateral incisor with double *dens invaginatus* associated with periradicular lesion.

Within the classification systems of DI, Ohlers's system is the most popular one. According to this system, invaginations are classified as follows: Type 1, Cases in which invagination is enamel-lined and ends as a blind sac within the crown; Type 2, Invagination extends apically beyond the cemento-enamel junction, but does not cross it; and Type 3, Invagination extends beyond the cemento-enamel junction, penetrates the surface of the root and a second "apical foramen" is evident.³ According to Ohlers's system, in our case, both invaginations are classified as Type 2.

Endodontic treatment of teeth with *dens invaginatus* with apical lesion generally involves complicated procedures that require correct diagnosis and appro-

appropriate endodontic planning.^{1,2,6} Careful radiographic evaluation may lead to identification or suspicion of anatomical conditions.⁶ The complex morphological features of *dens invaginatus* may pose clinical challenges. The case described herein demonstrated anatomical difficulties that can lead to endodontic failure. Due to the complexity of the root canal system and to avoid problems during treatment, access cavity preparation and endodontic treatment were carried out under an operating microscope. The increased magnification and dual light source of the microscope were crucial to diagnose, locate and correctly treat the invaginations. Warm gutta-percha fil-

ling techniques aim to produce a homogeneous mass of filling material that fills irregularities on the root canal system.¹⁰ Due to complex anatomy, Tagger hybrid technique was used in this case. This technique achieved excellent outcomes in filling canal irregularities and resulted in a substantial regression of the lesion one year after treatment onset

Conclusion

This case report highlighted the importance of correct diagnosis, proper instrumentation, disinfection and sealing, carried out by means of contemporary techniques, for successful *dens invaginatus* treatment.

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