

Nonsurgical Endodontic Management of Maxillary Lateral Incisor with Dens Invaginatus and Periradicular Lesion

Prerna Tripathi, Ayush Razdan Singh, Pushpendra Kumar Verma, Ruchi Srivastava¹

Departments of Conservative Dentistry and Endodontics and ¹Periodontology, Saraswati Dental College, Lucknow, Uttar Pradesh, India

Abstract

Dens invaginatus is a developmental malformation resulting from invagination of the tooth crown or root before calcification has occurred. It can range from a deep fissure or pit on the lingual surfaces of anterior teeth to an occlusal pit on the posterior teeth. This article presents a case of type II dens in dente in a 14-year-old female patient, where the invagination extends beyond the cemento-enamel junction in maxillary lateral incisor with a large periradicular lesion. Usually, an anomaly such as dens invaginatus remains unnoticed by the patient until any clinical sign appears. Root canal treatment of such teeth with complex root canal anatomy can be difficult because infected pulpal tissues may remain in inaccessible areas of the canal. Hence, it is important to identify this anomaly and manage it as early as possible. In the present case, a nonsurgical root canal treatment of the invagination was performed. The treatment of invagination resulted in resolution of a substantial periradicular lesion.

Keywords: Dens invaginatus, nonsurgical endodontics, periradicular lesion

INTRODUCTION

Dens invaginatus presents a challenge for endodontic treatment, because of the presence of a complicated canal system. These invaginations act as a niche for bacterial growth and may jeopardize the vitality of the main pulp canal. It was first described by “Ploquet” in 1794 in a whale’s tooth; later in the year 1855, Salter described it as “a tooth within a tooth.” After that in 1856, it was first described in a human tooth by a dentist named Socrates.^[1] Various terms for this anomaly are dens invaginatus, invaginated odontome, dilated gestant odontome, dilated composite odontome, tooth inclusion, and dentoid in dente. Of these terms, “dens invaginatus” would appear to be the most appropriate as it reflects the infolding of outer portion (enamel) into the inner portion (dentin) with formation of a pocket and dead space. The dentine below the invagination may be intact without irregularities but may contain strains of vital connective tissue or even fine canals with communication to the dental pulp.^[2] In most cases, dens invaginatus is detected by chance on radiograph. Radiographic examination is the most reliable way to diagnose such anomalies with significant possibility of pulpal involvement and pulpitis. Radiographically, the affected teeth show an infolding of enamel and dentine which may extend deep

into pulp cavity and sometimes even reach the root apex.^[3] The coronal type of invagination is lined with enamel and the radicular type of invagination is lined with cementum. Various authors have given different classifications for dens invaginatus, based on possible variations in clinical and radiographic appearance, but the system described by Oehlers in 1957 is most widely used.^[4] He classified dens invaginatus into three types, according to the depth of the invagination and the degree of communication with the periodontal ligament or the periradicular tissues:

- Type I: An enamel-lined minor form occurring within the confines of the crown not extending beyond the cemento-enamel junction
- 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
- Type III A: A form which penetrates through the root and communicates laterally with the periodontal ligament

Address for correspondence: Dr. Pushpendra Kumar Verma,
Department of Conservative Dentistry and Endodontics,
Saraswati Dental College, Lucknow, Uttar Pradesh, India.
E-mail: pushpendrakgmc@gmail.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Tripathi P, Singh AR, Verma PK, Srivastava R. Nonsurgical endodontic management of maxillary lateral incisor with dens invaginatus and periradicular lesion. *Int J Pedod Rehabil* 2017;2:81-4.

Access this article online

Quick Response Code:



Website:
www.ijpedor.org

DOI:
10.4103/ijpr.ijpr_13_17

space through a pseudoforamen. There is usually no communication with the pulp, which lies compressed within the root

- Type III B: A form which penetrates through the root and perforates at the apical area through a pseudoforamen. The invagination may be completely lined by enamel, but frequently cementum will be found lining the invagination.

Based on Oehlers' classification, the prevalence of each type of invagination was reported by Ridell *et al.*^[5] with Type I being the most common (79%) while Type II (15%) and III (5%) are less frequently observed.

Generally, Type I and Type II do not present any complications during endodontic treatment because invagination does not reach up to apical region of canal. However, in Type III, nonsurgical endodontic treatment is difficult because invagination may reach the root apex.

The treatment modalities of dens in dente range from conservative restorative procedures to nonsurgical root canal therapy, endodontic surgery, intentional replantation, or finally extraction.^[6] This article presents a case of dens in dente with periradicular pathology in maxillary left central incisor, which was successfully treated with nonsurgical endodontic approach.

CASE REPORT

A 14-year-old female patient was referred to the Outpatient Department of Saraswati Dental College, Lucknow, India, with a chief complaint of pain and discoloration in maxillary left anterior region. Clinical examination showed discolored maxillary left central incisor [Figures 1 and 2], which did not respond to thermal tests (heat and cold). The child also had a history of trauma 4 years back in the anterior region. On radiographic examination, a large periapical radiolucent area was present in relation to both the teeth 21 and 22. In addition, an evident tooth within a tooth appearance was present in the maxillary left lateral incisor [Figure 3]. A clinical diagnosis of dens in dente Type II with periradicular lesion was made. The treatment options were discussed with her parents and an informed consent was obtained. The treatment plan consisted of nonsurgical management of dens in dente with root canal treatment. Under rubber dam isolation, the tooth preparation was initiated. After access opening, the dens in dente was also carefully prepared along with the main canal [Figures 4 and 5]. There appeared to be no communication between the main root canal and the invaginated canal. The canals were instrumented circumferentially and enlarged from sizes #40–80. Sodium hypochlorite was used as an irrigant. A nonsetting calcium hydroxide-iodoform paste (Metapex) was used as an intracanal medicament and a noneugenol temporary cement (Cavit, 3M ESPE) was given. At subsequent visit after 5 days, the patient was asymptomatic and both the canals were obturated with gutta-percha cones and calcium hydroxide sealer [Figures 6 and 7]. The



Figure 1: Preoperative.



Figure 2: Preoperative (palatal view).



Figure 3: Preoperative intraoral periapical X-ray with dens in dente.

canals were laterally condensed using accessory cones, and the access cavity was sealed with final restoration using composite [Figure 8]. Postoperative instructions were given, antibiotics were prescribed for 1 week, and analgesics were advised when pain persists. At subsequent follow-up examinations, after 6 months and 1 year, the tooth was asymptomatic and postoperative radiograph revealed complete healing in periradicular region.



Figure 4: Access cavity preparation with dens in dente.



Figure 5: Working length determination.

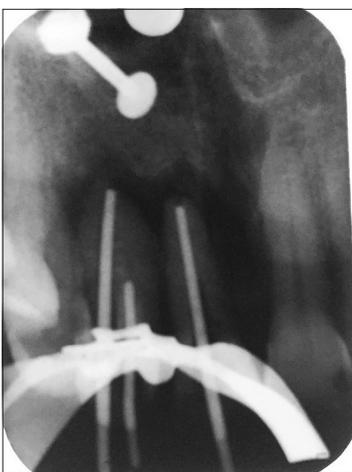


Figure 6: Master cone selection.



Figure 7: Intraoral periapical X-ray with obturation.

DISCUSSION

Dens in dente is observed in 0.25%–5% of individuals. It is most commonly associated with maxillary lateral incisors (1.7%–38.5%), and the female-to-male ratio is 3:1 with female predilection.^[7] It is more frequent in the maxilla than the mandible and is seen most often in Caucasians and Asians.^[4,8] Although mostly asymptomatic, dens invaginatus has been reported to be associated with various syndromes such as Ekman-Westborg-Julin syndrome, Williams syndrome, and Nance–Huran syndrome.^[9] The presence of invagination is considered to increase the risk of caries, pulpal pathosis, and periodontal inflammation because it may allow the entry of irritants into an area which is separated from pulpal tissues by a thin layer of enamel and dentin only. At times, clinically, there is unusual crown morphology (“dilated,” “peg-shaped,” “barrel-shaped”), but the affected teeth may not show any clinical signs of malformation. Bäckman and Wahlin^[10] reported that about 6.8% of patients had dens invaginatus, with peg-shaped lateral incisors 0.8%, gemination 0.3%, and taurodontism 0.3%. The same study showed the presence of more common hypodontia (7.4%) than hyperdontia (1.9%). In

the present case, dens invaginatus was classified as Oehlers type II because the radiographic examination showed that the invagination invaded the root. In this type of developmental defect, there may be a direct communication between the pulp and the oral cavity. Microorganisms from the saliva can infect the pulp and consequently cause necrosis of pulp, leading to the formation of a periapical lesion. It is also advisable to take radiographs from various angles to provide a better understanding of the extensions of the anomaly. Even if there are no symptoms, a radiograph of contralateral tooth should also be performed for anatomical differences. In this case, complete disinfection of the canals was of great importance to promote healing of affected periradicular tissues. In some cases, isolated endodontic treatment of the invaginated canal had been sufficient which maintained the pulpal vitality. However, this was not possible in this case presented here because there was a presence of a large periradicular lesion. Surgical intervention is indicated in cases when nonsurgical root canal treatment has failed or anatomic variations of canals do not allow access for biomechanical preparation or in tooth with wide-open apex where apexification is required.^[11]



Figure 8: Postoperative.

CONCLUSION

Dens invaginatus is an anomaly that may lead to pulp infection and periapical pathosis through invagination. Thus, an early detection and proper sealing with restorative material is necessary to prevent further complications. In the present case, endodontic intervention alone resulted in the resolution of a substantial peri-invagination lesion.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Munir B, Tirmazi SM, Majeed HA, Khan AM, Iqbalbangash N. Dens invaginatus: Aetiology, classification, prevalence, diagnosis and treatment considerations. *Pak Oral Dent J* 2011;31:191-8.
2. Rani N, Sroa RB. Nonsurgical endodontic management of dens invaginatus with open apex: A case report. *J Conserv Dent* 2015;18:492-5.
3. Verma KG, Basavaraju S, Jindal S, Sachdeva S. Bilateral radicular dens in dente in mandibular premolars. *J Oral Maxillofac Radiol* 2013;1:115-7.
4. 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.
5. Ridell K, Mejäre I, Matsson L. Dens invaginatus: A retrospective study of prophylactic invagination treatment. *Int J Paediatr Dent* 2001;11:92-7.
6. Yogesh BG, Abdul Kader AK, Sreedevi PV, Shetty C, Kumar A, Ashwini B. Case report: Endodontic management of dens in dente. *Int J Adv Res* 2016;4:347-50.
7. Pindborg JJ. *Pathology of the Dental Hard Tissues*. Philadelphia: WB Saunders; 1970. p. 58.
8. Serrano J. Triple dens invaginatus in a mesiodens. *Oral Surg Oral Med Oral Pathol* 1991;71:648-9.
9. Mupparapu M, Singer SR, Pisano D. Diagnosis and clinical significance of dens invaginatus to practicing dentist. *N Y State Dent J* 2006;72:42-6.
10. Bäckman B, Wahlin YB. Variations in number and morphology of permanent teeth in 7-year-old Swedish children. *Int J Paediatr Dent* 2001;11:11-7.
11. Srivastava R, Verma PK, Tripathi V, Tripathi P, Singh AR. Management of Oehlers type II dens in dente with open apex and alveolar bone defect. *J Clin Diagn Res* 2016;10:ZJ05-6.