

Internal resorption in an incisor with dens invaginatus

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ABSTRACT

Dens invaginatus is a developmental malformation of teeth that most commonly affects permanent maxillary lateral incisor. The clinical importance of dens invaginatus results from the risk of pulpal disease. The presence of dens invaginatus with internal resorption is extremely rare. Hence, all clinicians should be aware of this anomaly. The present case describes the treatment and prognosis of an unusual case of dens invaginatus with internal resorption in a maxillary lateral incisor. Endodontic treatment with using Gutta-percha and root canal sealer was considered successful at the 7-year follow-up.

Key words: Dens invaginatus, Endodontic therapy, Internal resorption

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INTRODUCTION

Dens invaginatus is a developmental anomaly occurred by invagination of enamel organ into dental papilla before calcification of dental tissue.^[1] Although its etiology is not known well, along with the external factors such as trauma and infection occurred during tooth development, it is reported that genetic factors also can be effective.^[2] It is also named as dens in dente,^[3] dilated composite odontome,^[4,5] gestant anomaly.^[6] Its prevalence ranges from 0.04% to 10%.^[7] Whereas this anomaly that can also be seen in primary tooth,^[8-10] is generally encountered in upper lateral incisors, it involves posterior group teeth occasionally.^[11]

Dens invaginatus is classified in 3 categories according to the depth of the invagination and its relationship with the periapical tissue or the periodontal ligament. Type I invagination is limited inside the crown, extended only to cemento-enamel junction; Type II invagination extends below cemento-enamel junction inside the root, but it does not reach to periodontal ligament or periapical tissues; Type III is characterized an invagination extending throughout the root in apical direction and generating a second foramen in lateral periodontal ligament or periodontal tissue.^[5]

Clinically, dens invaginatus is generally seen in cingulum region of anterior group teeth. In the teeth with dens invaginatus, along with normal morphology, peg or conical shape, large palatal cingulum or talon cusp,^[5] increased labio-lingual or mesio-distal diameter and incisal notching in association with a labial groove^[12] can be seen.

Invagination is separated from pulp chamber with a thin wall and in contact with oral environment and pulp cavity through small canals. In the presence of dental caries, these canals cause pulp diseases by permitting the transmission of microorganisms and irritants. Color changes, open apex, abscess, cyst and periapical granuloma related to dens invaginatus were reported.^[13,14] In the literature, there are a few reports presenting the cases with dens invaginatus led to internal resorption.^[15-17]

Internal resorption is a pathological process seen with dentine loss inside the pulp cavity. It is thought that the dentine resorption occurs as a result of the loss of the protective layer consisting of odontoblasts and predentin along with the chronic inflammatory process in pulp tissue.^[18,19]

The aim of this case report was to present the therapy, prognosis and 7-year follow-up of an upper lateral incisor

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tooth with dens invaginatus and internal resorption which is rarely encountered.

CASE REPORT

A 16-year-old, healthy female patient named M.K. was referred to ... Faculty of Dentistry, the Department of Pedodontics with severe pain in the region of upper anterior teeth. Patient had no trauma history. In clinical examination, it was observed that all of the teeth were healthy and there were crowding and increased overjet in upper anterior region [Figure 1a and b]. It was determined that labio-lingual diameters of both of the permanent maxillary lateral incisors were larger than normal and they had deep small cavities in their cingulum region. The permanent maxillary right lateral incisor was tender to palpation and percussion tests and had no response to vitality test. In radiologic examination, Type II invagination was seen and a perforation resulting from internal resorption due to invagination extending up to middle third of the root was observed and there was a large radioluscent area at the adjacent region [Figure 1c]. The other permanent maxillary incisors showed positive response to vitality test and had no radiological finding was observed [Figure 2].

Following clinical and radiological examinations, root canal treatment on the permanent maxillary lateral incisor tooth was decided. The planned therapeutic procedures and possible problems were explained to the patient and her parents, and their written consents were received.

Isolation of the tooth with a rubber dam and endodontic access preparation was made. Root canal length was determined with manual instruments. Removal of the necrotic pulp was done by inserting, rotating and withdrawing a large K-file. The canal was carefully shaped with hand files, in a circumferential technique. Copious irrigation with 1% sodium hypochlorite solution was employed throughout the procedure. A sterile cotton pellet was placed in the pulp chamber, and the access cavity sealed with a temporary filling material. At the same treatment session, the cingulum region of permanent maxillary left lateral tooth was covered with fissure sealant for protective purpose. One day later, the patient returned with the severe pain. After rubber dam isolation, the canal was irrigated with 1% sodium hypochlorite and an antibiotic and an anti-inflammatory drug were administered. Five days later, the patient returned without symptoms. The canal was irrigated with 1% sodium hypochlorite. Fit of the master gutta-percha cone was assessed radiographically. Final irrigation was made, and root canal was dried with sterile paper tips. Apical part of the root canal and internal resorption area with coronal part of the root canal was obturated respectively by

lateral condensation of gutta-percha and root canal sealer paste (apexit, ivoclar vivodent) [Figure 3]. Two weeks later, the patient had no symptoms, and a temporary filling was replaced by a composite filling using the acid-etch technique.

After 3 months, the tooth had no symptom, she was referred to the department of orthodontics because of the crowding and increased overjet of the anterior teeth [Figure 4]. The tooth was controlled periodically during the orthodontic therapy [Figure 5a and b]. At the end of the 7th year, no clinical and radiological symptoms were observed [Figure 6].

DISCUSSION

In this case report, we observed resorption area at the middle third of the root. Many methods can be used to distinguish external and internal resorption with radiological findings; radiographs taken at different angles will result in movement of the lucency on the root in external resorption, while the lucency will stay close to the canal with internal resorption.^[19] Internal resorption will have clearly defined borders with no canal radiographically visible in the defect while external resorption has irregular lucency, and the canal can often be seen through the lucency.^[20] In radiographic examination, internal resorption features were observed in assessed radiographs thus our diagnosis was internal resorption.

Although the etiology of the mechanism of internal resorption has not been exactly known, it is believed to be very similar to the mechanism of bone resorption. It has been suggested that internal resorption is caused by trauma, infection or excessive heating of the dental pulp.^[19]

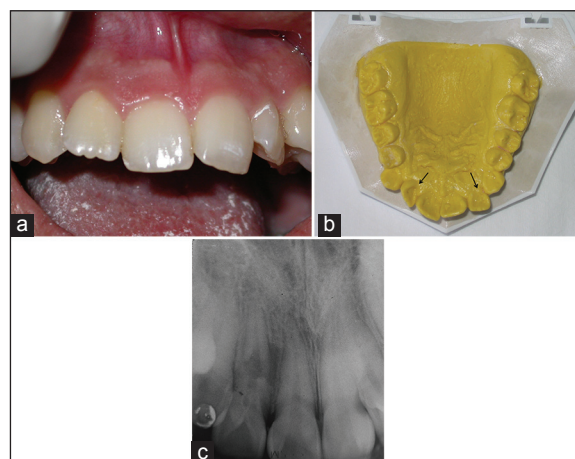


Figure 1: (a) Clinical appearance of the tooth before treatment. (b) The appearance of the stone model of the patient. Dens invaginatus is seen in cingulum region of maxillary lateral incisors (arrows). (c) Periapical radiography of the tooth



Figure 2: The other maxillary incisors were healthy



Figure 3: Periapical radiography of the tooth after canal filling

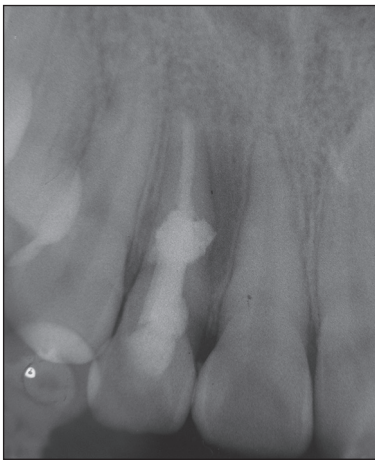


Figure 4: The radiographic appearance of the tooth 3 months after the treatment

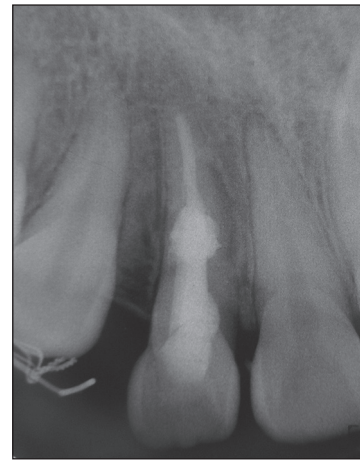


Figure 5a: Periapical view of the tooth 3 years after

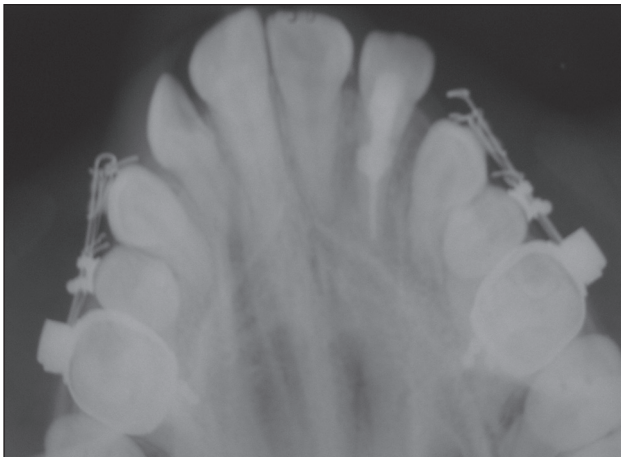


Figure 5b: Occlusal view of the tooth 3 years after the treatment



Figure 6: A 7-year follow-up periapical radiography

These irritations lead to inflammation by affecting pulp tissue and transformation of a part of the undifferentiated cells in the pulp into osteoclasts or macrophages induced the resorption of dentin.^[21] Since, there were not findings that could lead to internal resorption, we think that the

pulp inflammation caused by deep invagination of lateral incisor had caused internal resorption.

In the literature, there is limited information about the cases with dens invaginatus causing internal resorption, and it is emphasized to be rarely encountered. In a study, dens

invaginatus was determined in 795 teeth of 2477 patients and in 9 of these teeth periapical pathology was seen.^[22] Determination of only one tooth with internal resorption in this study shows that this situation is considerably rare. For this reason, we believe that this study contributes to the literature.

Clinical diagnosis of invaginated teeth requires having knowledge about this issue. The dentists are overlooking this situation cause patients not to have early diagnosis-therapy service. The extension of the internal resorption area that can be seen in the invaginated teeth reveals the need of more complicated procedures for these difficultly treated teeth and consequently the chance of success of the therapy diminishes while the duration and the cost of the therapy increase. We determined that the complaint of our patient regularly checked by us was due to the invaginated tooth, and the therapy was begun. Since the patient's problem was not diagnosed early prior to the application to our clinic, the resorption area was developed, and a prolonged therapeutic process with an uncertain prognosis was performed.

For filling the resorptive defect of the teeth with internal resorption, materials such as zinc oxide-eugenol, composite resin, amalgam^[23] or mineral trioxide aggregate^[24] and the techniques using gutta-percha such as thermo-mechanical and thermo-plasticized core, warm vertical condensation, warm lateral condensation and cold lateral condensation can be useful.^[25] For filling the resorptive defect, we use $\text{Ca}(\text{OH})_2$ for maximizing the effect of disinfection procedures, control the bleeding, and necrotize residual pulp. At the end of 7th year, although the patient is receiving orthodontic treatment in this period, the prognosis of the tooth filled with a paste containing $\text{Ca}(\text{OH})_2$ by cold lateral condensation technique was well.

CONCLUSION

Especially upper lateral incisors with a deep foramen should absolutely be evaluated radiographically. Different therapeutic alternatives because of cosmetic concerns should be considered for anterior teeth with dens invaginatus. An early diagnosis of the cases with dens invaginatus in childhood period provides preventive treatment and can prevent the future endodontic, prosthodontic and esthetic problems.

There were limited information about internal resorption in a tooth with dens invaginatus, the prognosis and the possible response to orthodontic treatment of these teeth in the literature. Successful results of our 7-year follow-up case report will contribute on this subject.

REFERENCES

1. Lee AM, Bedi R, O'Donnell D. Bilateral double dens invaginatus of maxillary incisors in a young Chinese girl. *Aust Dent J* 1988;33:310-2.
2. Nallapati S. Clinical management of a maxillary lateral incisor with vital pulp and type 3 dens invaginatus: A case report. *J Endod* 2004;30:726-31.
3. Thomas JG. A study of dens in dente. *Oral Surg Oral Med Oral Pathol* 1974;38:653-5.
4. Hunter HA. Dilated composite odontome; reports of two cases, one bilateral and one radicular. *Oral Surg Oral Med Oral Pathol* 1951;4:668-73.
5. 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.
6. Colby RA, editor. *Colour Atlas of Oral Pathology*. Philadelphia: J.B. Lipincott Co.; 1956. p. 34-5.
7. Hovland EJ, Block RM. Nonrecognition and subsequent endodontic treatment of dens invaginatus. *J Endod* 1977;3:360-2.
8. Holan G. Dens invaginatus in a primary canine: A case report. *Int J Paediatr Dent* 1998;8:61-4.
9. Eden EK, Koca H, Sen BH. Dens invaginatus in a primary molar: Report of case. *ASDC J Dent Child* 2002;69:49-53, 12.
10. Lichota D, Lipski M, Wozniak K, Buczkowska-Radlinska J. Endodontic treatment of a maxillary canine with type 3 dens invaginatus and large periradicular lesion: A case report. *J Endod* 2008;34:756-8.
11. Hamasha AA, Alomari QD. Prevalence of dens invaginatus in Jordanian adults. *Int Endod J* 2004;37:307-10.
12. Khabbaz MG, Konstantaki MN, Sykaras SN. Dens invaginatus in a mandibular lateral incisor. *Int Endod J* 1995;28:303-5.
13. De Smit A, Demaut L. Nonsurgical endodontic treatment of invaginated teeth. *J Endod* 1982;8:506-11.
14. Gound TG, Maixner D. Nonsurgical management of a dilacerated maxillary lateral incisor with type III dens invaginatus: A case report. *J Endod* 2004;30:448-51.
15. Bellizzi R. Dens in dente with internal resorption. *Oral Surg Oral Med Oral Pathol* 1971;32:155-6.
16. al-Waheidi EM. Internal root resorption from palatal invaginations. *J Clin Orthod* 1989;23:802-3.
17. Mangani F. Endodontic treatment of a "peculiar" upper central incisor. *G Ital Endod* 1991;5:106-8.
18. Tronstad L. Root resorption — etiology, terminology and clinical manifestations. *Endod Dent Traumatol* 1988;4:241-52.
19. Trope M, Chivian N. Root resorption. In: Cohen ST, Burns R, editors. *Pathways of the Pulp*. 6th ed. St. Louis, MO: Mosby; 1994. p. 486-512.
20. Gulabivala K, Searson LJ. Clinical diagnosis of internal resorption: An exception to the rule. *Int Endod J* 1995;28:255-60.
21. Kinomoto Y, Noro T, Ebisu S. Internal root resorption associated with inadequate caries removal and orthodontic therapy. *J Endod* 2002;28:405-7.
22. Kirzioğlu Z, Ceyhan D. The prevalence of anterior teeth with dens invaginatus in the western Mediterranean region of Turkey. *Int Endod J* 2009;42:727-34.
23. Culbreath TE, Davis GM, West NM, Jackson A. Treating internal resorption using a syringeable composite resin. *J Am Dent Assoc* 2000;131:493-5.
24. Jacobovitz M, de Lima RK. Treatment of inflammatory internal root resorption with mineral trioxide aggregate: A case report. *Int Endod J* 2008;41:905-12.
25. Gencoglu N, Yildirim T, Garip Y, Karagenc B, Yilmaz H. Effectiveness of different gutta-percha techniques when filling experimental internal resorptive cavities. *Int Endod J* 2008;41:836-42.

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