

Dens invaginatus

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Summary

Dens invaginatus is a developmental malformation, which concerns the non-typical arrangement of dental hard tissues. This article presents a report of a 35-year-old man with dens invaginatus in his permanent mandibular left canine.

Key words: dens invaginatus, developmental anomalies.

Introduction

Dens invaginatus is a developmental anomaly, which arises as a result of an invagination of enamel organ through dental papilla, in the early phase of odontogenesis, before calcification occurs [1, 2, 3, 4]. This developmental malformation, which occurs during the morphological stage of development, is characterized by the presence of an extra cusp that takes the form of a tubercle arising from the occlusal or lingual surface [5]. The term “dens in dente”, which means the appearance of a tooth within a tooth, with a severe invagination, was first used by Ploucquet, in 1974. It has been referred to as dilated composite odontoma, telescope teeth, gestant anomaly and dens invaginatus [6]. Today, the term dens invaginatus is most frequently used because the protuberance includes enamel as well as dentin and pulp tissue [4, 5, 7].

Various aetiological factors for dens invaginatus have been suggested: increased localized external pressure, focal growth retardation and focal growth stimulation in the dental germ [2, 3, 4, 6, 8, 9].

The permanent maxillary lateral incisors and supernumerary teeth are the most frequently involved teeth [2, 10]. Bilateral occurrence of this anomaly is commonly seen [2, 10, 11]. Mandibular permanent teeth and primary dentition are rarely affected by dens invaginatus [4, 9, 12, 13]. The invagination is frequently encoun-

tered at the coronal part, but sometimes invagination may extend to the apices of the root. Oehlers describes three forms of dens invaginatus [4, 6, 8, 9]:

- type I: the invagination involves only the coronal part of the tooth;

- type II: the invagination extends apically beyond the cemento-enamel junction, but never reaches the periapical tissues;

- type III: the invagination extends beyond the level of the cemento-enamel junction and reaches either the periapical tissues or the periodontal membrane, via a foramen.

Case report

A 35-year-old man was referred to the Department of Oral and Maxillofacial Surgery with the complaint of a swelling in the left mandibular canine region. He stated that a dentist tried to remove a root remnant and added that the extraction was unsuccessful. Clinical examination showed a prominence located between the left lateral incisor and first premolar area (*Figure 1*). Radiological examination revealed a well-defined radioopaque lesion between, which made a remarkable displacement in the neighboring teeth (*Figure 2*).

Amoxicillin (1gr, 2 x 1) was prescribed preoperatively and after 5 days, when the acute phase was remitted, the lesion was removed under local anesthesia by making a Peter Novak



Figure 1. Clinical appearance of the lesion

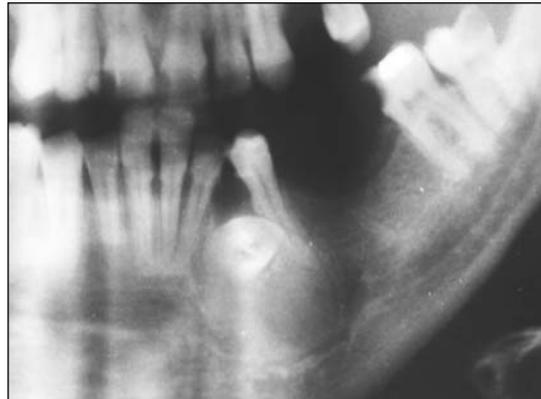


Figure 2. Radiological view of the dens invaginatus



Figure 3. Intraoperative view of the lesion



Figure 4. Appearance of the lesion demonstrating the invagination of the canine tooth

incision (*Figure 3*). After its removal (*Figure 4*), the first premolar tooth, which was next to the lesion, became mobile and it was extracted. The flap was repositioned with 4/0 silk sutures. The material was fixed with 10% formaline and then calcified with 50% formic acid and 20% sodium citrate solutions. Sections were prepared with a 5-7 micron thickness and were treated with hemotoxylin-eosin before examination under a light microscope. The biopsy report named the lesion as „dens in invaginatus“ (*Figures 5, 6*). On the 7th day appointment it was observed that the soft tissue healing was normal and the sutures were removed.

Discussion

„Dens invaginatus“ is a rare malformation of teeth, probably resulting from an infolding of the dental papilla during tooth development [14]. In the majority of cases, the simplest form occurs.

This has normal tooth appearance and an enamel lined invagination cavity. The incidence of this anomaly is reported to be between 0.25% and 10% [3, 10]. It is mostly observed in the maxilla, compared to mandible and it occurs bilaterally in 43% of the cases [15]. Severe invagination malformation is encountered less frequently than simple invagination [4, 8, 9]. Severe cases of dental invagination can be usually detected by routine clinical and radiological examination [10]. However, in the majority of cases, the simplest form is not easily diagnosed clinically before pulpitis and apical periodontitis occur [1, 6, 8, 9, 10, 15, 16]. In our case, contrary of the descriptions of Kannan et al [15], it occurred unilaterally in the mandible region and it was clearly detectable by radiological findings.

Histological studies have shown the presence of channels connecting the cavity of invagination with the pulp chamber. The dental plaque gains direct access to pulp cavity via this chan-

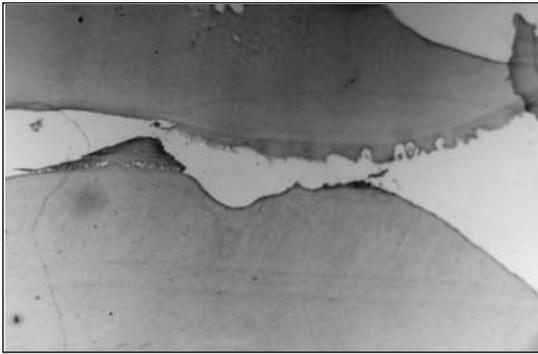


Figure 5. Dentin tissue can be observed in the invagination area (H&E x 100)

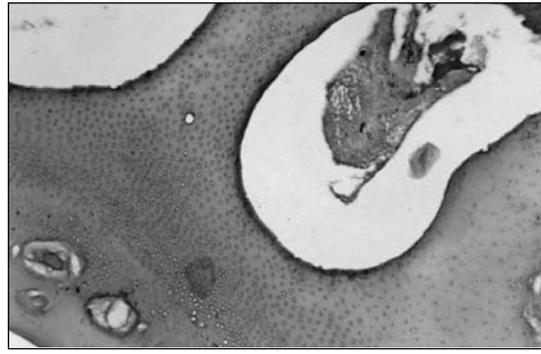


Figure 6. Appearance of decalcified enamel matrix located in the dentin tissue (H&E x 100)

nel. Thereby, severe cases of dental invagination can lead to pulp necrosis and acute apical periodontitis [1, 3, 4, 8, 9, 10].

In some cases, dens invaginatus is encountered with taurodontism, microdontia, gemination, supernumerary teeth and dentinogenesis imperfecta [17, 18, 19], and occurs rarely in primary teeth [20].

References

1. Johnson R. Odontologic Diseases In: Lynch M.A., Brightman V.J., Greenberg M.S. Burket's Oral Medicine. 8th ed., Philadelphia, Lippincott Co., p. 536, 1984.
2. Morfis A.C. Clinical analysis of a dens invaginatus by S.E.M. microanalysis. *J Clin Pediatr Dentistry*, 1992; **17(1)**: 79-82.
3. Nic-Hussein N.N. Dens Invaginatus: Complications and treatment of non-vital infected tooth. *J Clin Pediatr Dentistry*, 1994; **18(4)**: 303-306.
4. Schulze C. Developmental abnormalities of the teeth and jaws. In: Gorlin R.J., Goldman H. M. Thoma's Oral Pathology 6th ed. St. Louis, The C.V. Mosby Co., p. 108, 1970.
5. Danker E., Harari D., Rotstein I. Dens invaginatus of anterior teeth: Literature review and radiographic survey of 15 000 teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 1996; **81**: 472- 476.
6. Ölmez S., Uzamis M., Er N. Dens invaginatus of a mandibular central incisor: surgical endodontic treatment. *J Clin Pediatr Dentistry*, 1995; **20**: 53-56.

The treatment of these teeth ranges from nonsurgical endodontic treatment to endodontic surgical treatment or extraction. To prevent potential complications that could arise from dens invagination, prophylactic treatment of this anomaly should be performed. In the case reported, considering the acute phase of the patient, the removal of the lesion was decided.

7. Teplitsky P., Singer D. Radicular Anomaly of a Maxillary Canine: Endodontic Treatment. *J Endod*, 1987; **18**: 81-84.
8. Schafer W.G., Levy B.M. A Textbook of Oral Pathology. 3th ed., Philadelphia, W.B. Saunders Co., pp. 38-39, 1974.
9. Soames J.V., Southam J.C. Oral Pathology. Tokyo, Oxford University Press, p. 206-212, 1985.
10. Hulsmann M. Severe dens invaginatus malformation: report of two cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 1996; **82**: 456- 458.
11. Noikura T., Ooya K., Kikuchi M. Double dens in dente with a central cusp and multituberculum in bilateral maxillary supernumerary central incisors. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 1996; **82**: 466- 469.
12. Burton D.J., Saffos R.O., Scheffer R.B. Multiple bilateral dens in dente as a factor in the etiology of multiple periapical lesions. *Oral Surg Oral Med Oral Pathol*, 1980; **49**: 496-499.
13. Ruprecht A., Batriji S., Neweihi E. The incidence of dental invagination. *J Pedod*, 1986; **10**: 265-272.
14. Goncalves A., Goncalves M., Oliveira D. P., Goncalves N. Dens invaginatus type III:

report of a case and 10-year radiographic follow-up. *Int Endod J*, 2002; Oct, **35(10)**: 873-879.

15. Kannan S.K., Bharadwaj T.P., Urraj G. Dens in dente (dens invaginatus). Report of two unilateral and one bilateral case. *Indian J Dent Res*, 2003; Apr-Jun, **14(2)**: 125-129.

16. Zegarelli E. V., Kutscher A. H., Hyman G. A. Diagnosis of diseases of the mouth and jaws. 2nd edition. Lea and Febler, Philadelphia, p. 523, 1978.

17. Casamassimo P.S., Nowak A.J., Ettinger R.L., Sciender D.J., Rapids G. An unusual triad: Microdontia, taurodontia and dens invaginatus.

Oral Surg Oral Med Oral Pathol, 1978; **45**: 107-112.

18. Kerebel B., Kerebel L., Dacuisi G., Doury J. Dentinogenesis imperfecta with dens in dente. *Oral Surg Oral Med Oral Pathol*, 1983; **52**: 279-285.

19. Mader C. Double dens in dente a geminated tooth. *Oral Surg Oral Med Oral Pathol*, 1979; **47(6)**: 573.

20. Eden E.K., Koca H., Sen B.H. Dens invaginatus in a primary molar: report of case. *ASDC J Dent Child*, 2002; Jan-Apr, **69(1)**: 49-53.

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