

Dens Invaginatus in Primary Maxillary Molar: A Rare Case Report and Review of Literature

Arpana V Bansal, Abhinav Bansal, Vinaya Kumar Kulkarni, Reema Sharma Dhar

ABSTRACT

Dens invaginatus is a rare developmental anomaly. It is unusual to find this anomaly in primary dentition. Diagnosis of this dens invaginatus is important due to possible pulpal involvement. Not only that, simultaneous presence of other dental anomaly may require long-term treatment planning. Dens invaginatus can be detected clinically in the tooth presenting unusual crown morphology or radiographically as radiopacity within tooth. This article describes one of the first case reports of dens invaginatus in primary maxillary second molar in a 5-year-old female patient.

Keywords: Dens invaginatus, Primary molar, Diagnosis, Anomaly.

How to cite this article: Bansal AV, Bansal A, Kulkarni VK, Dhar RS. Dens Invaginatus in Primary Maxillary Molar: A Rare Case Report and Review of Literature. *Int J Clin Pediatr Dent* 2012;5(2):139-141.

Source of support: Nil

Conflict of interest: None declared

INTRODUCTION

Dental anomalies are associated with both the primary and the permanent dentitions and can affect either the morphology or the number of teeth.¹ Dens invaginatus is one such developmental anomaly. It is also called dens in dente, dilated composed odontoma or gestant odontoma,² resulting from invagination of enamel organ into the dental papilla, beginning at the crown and sometimes extending into the root before calcification occurs.^{3,4}

Various explanations have been proposed by different workers for etiology of DI. According to Pindborg,⁵ the etiology of this malformation is unknown; yet the following explanations have been proposed: (i) Delayed focal growth, (ii) stimulation in the area of the tooth bud and (iii) abnormal pressure on tissues surrounding the dental organ. Kronfeld⁶ proposed that DI is caused by a focal failure of growth of the internal enamel epithelium, leading to the proliferation of the surrounding normal epithelium with eventual engulfment of the static area. Oehlers⁷ stated that distortion of the enamel organ occurring during tooth development and results in protrusion of the part of the enamel organ. While some authors believe infection, trauma and genetics to be the reason for DI.⁸

Clinically, dens invaginatus appears in the tooth crown at the site of an anatomical lingual pit susceptible to caries.⁹ Crown of the affected teeth may appear normal in size and shape or may be malformed with a wide apical foremen.⁸

Radiographically, it shows a radiopaque invagination, equal in density to enamel, extending from the cingulum into the root canal. The defects may vary in size and shape from a loop like, pear-shaped or slightly radiolucent structure to a severe form resembling a 'tooth within a tooth'.¹⁰ It can be identified easily because infolding of the enamel lining is more radiopaque than the surrounding tooth structure.³ Roots of the affected tooth may present smaller dimensions.¹¹

Oehlers⁷ described dens in dente according to invagination degree in three forms:

Type 1: An enamel-lined minor form occurs within the crown of the tooth and not extending beyond the cemento-enamel junction.

Type 2: An enamel-lined form which invades the root as a blind sac and may communicate with the dental pulp.

Type 3: A severe form which extends through the root and opens in the apical region without communicating with the pulp.

Dens invaginatus was first observed by De Smit and Demaut¹² in 1856. Mann¹³ in 1990 described presence of dens invagination in primary molar of a 5-year-old child from fifteen century. Simultaneous presence of other dental anomalies like dentinogenesis imperfecta, germination, taurodontism, microdontia, supernumerary teeth and short roots along with dens invaginatus had been reported in past.¹⁴ Dens invaginated tooth pose abnormal anatomical configuration. There is presence of thin canals or fissures connecting the invagination to the pulp cavity. This act as pathways for microorganism and irritating agents from oral cavity to seep to pulp leading to alteration in pulp before the development of caries.¹¹ Therefore, early diagnosis and management are crucial.

Presence of dens invaginatus in primary dentition is rare.¹⁵ Only few cases had been reported during computerized search. This article describes one of the first case reports of dens invaginatus in primary maxillary molar.

CASE REPORT

History

A 5-year-old female patient reported to the department of pedodontics and preventive dentistry with a chief complain of severe pain and swelling in the left upper back region since 20 days. The patient was having continuous pain and was able to localize the left maxillary second primary molar

as the tooth in question. Pain aggravated on chewing food and was relieved on taking medication. The patient's medical history was noncontributory.

CLINICAL EXAMINATION

Extraoral examination revealed diffuse swelling on left side of face. Intraorally, swelling was present on the palatal, buccal and distal side of left primary maxillary second molar (indicated by arrow in Fig:1(A)). The affected tooth was grossly carious (Fig. 1) involving almost all surface of tooth and appeared severely hypoplastic. Exudate was present within the tooth.

RADIOGRAPHIC EXAMINATION

Intraoral periapical radiograph showed presence of oval shaped radiopacity giving impression of tooth like structure within left primary maxillary second molar (Fig. 2). Thin root canal wall and broad open apex was present with respect to palatal root (indicated by black color arrow in Figure 2A). Mesial and distal roots appear to short. The tooth germ of the maxillary second premolar was smaller in dimensions (rudimentary) than normal, under the root of primary maxillary second molar (indicated by orange color arrow in Figure 2B). Radiographic appearance of the tooth suggested the presence of a dens invaginatus.

TREATMENT

Considering complex unfavorable root morphology (delicate root canal wall and wide apical foramen) and clinical presentation of case, extraction was considered as treatment of choice. Antibiotic and analgesic was prescribed to alleviate the infection and pain. One week later the tooth was extracted. Unfortunately, owing to badly destruction



Fig. 1: Intraoral view showing grossly carious left primary maxillary second molar (A) arrow indicating intraoral swelling around affected tooth



Fig. 2: IOPA radiograph showing oval radiopacity within the crown and root portion of primary maxillary second molar (indicated by oval outline) (A) black color arrow indicating open apex of palatal root, (B) orange color arrow indicating rudimentary tooth bud of maxillary second premolar

of tooth surface due to dental caries and thin root wall, it was not possible to remove tooth in one piece. We were able to retrieve tooth only into small coronal and root pieces. An orthodontic treatment plan has been made for space management of the extracted tooth.

DISCUSSION

Dens invaginatus is a defect in morphological development whereby the coronal enamel and dentin become inverted into the pulp chamber.¹⁶ In majority of cases dental caries develop inside the dens invaginatus without any clinically detectable lesion. As the enamel lining is thin and is in close proximity to the pulp chamber, a carious lesion easily perforate pulp chamber.¹⁵ Many treatment regimens have been suggested, such as prophylactically sealing invagination with resin, conventional root canal treatment, combined root canal-surgical treatment, intentional replantation and extraction.¹¹

The dental professionals frequently use dental radiographs as an important diagnostic tool. Diagnosis of dens invaginatus in present case was based on radiographic findings. Deep invagination in our case had lead to thin root canal wall and wide open apex. Not only that a lot of destruction of crown structure had occurred due to dental caries. This had made any preventive treatment and root canal treatment impossible in the affected tooth.

The incidence of dens invaginatus ranges from 0.04 to 10% and primarily affects the permanent dentition.^{17,18} In permanent dentition it commonly occurs in maxillary lateral incisors followed by the maxillary central incisors, premolars, canines and less often in the molars.³ Invaginations are rare in the mandibular teeth and in primary teeth.¹⁹ There

are only four well-documented cases in primary dentition. One of the earliest case reports (1952) describes dens invaginatus in primary maxillary canine.²⁰ Early diagnosis, prompt treatment is vital to prevent any complication caused by invasion of microorganism via thin canals connecting the invagination to the pulp cavity. Initially pulp probably remains uninfected; however, the infection may reach the pulp through the apical opening. Holan¹³ had described dens invaginatus in primary left mandibular canine in 5-year-old child. Owing to pathology in canine, root canal treatment was done. Kupietzky²¹ followed preventive therapy utilizing composite restoration in defected dens invaginated primary maxillary central incisor. Eden et al¹⁶ reported a case of dens invaginatus in mandibular left second primary molar. Attributable to periapical pathology, the affected molar was extracted. Tooth germ of mandibular second premolar was missing in same patient.

Interestingly, all these cases were in male patient. This is one of the first case reports which describe presence of dens invaginatus in primary maxillary second molar in 5-year-old female patient.

CONCLUSION

Early diagnosis of dens invagination is of clinical significance. Microorganisms invade the invagination and cause inflammation of the tissue. Inflammatory sequel related to invagination can be avoided by early diagnosis and prophylactic treatment. Radiographs are valuable means of diagnosis along with clinical examination in case of dens invagination.

REFERENCES

1. Uysal S, Nazikođlu A, Avcu N, Müftüođlu S. Dens in dente and fusion occurring in two supernumerary teeth: Report of an unusual case. Hacettepe Dishekimliđi Fakiitesi Dergisi. Cilt: 30, Sayı: 3 Sayfa: 2006. p. 54-59.
2. Shafer, WG.; Hine, MK.; Levy, BM. A textbook of oral pathology. 4th ed. Philadelphia: WB Saunders; 1987. p. 41-42.
3. White, SC; Pharoah, MJ. Oral radiology principles and interpretation. St Louis: Mosby; 2000. p. 314-315.
4. Lee AM, Bedi R, O'Donnell D. Bilateral double dens invaginatus of maxillary incisors in a young Chinese girl. Aust Dent J 1988 Aug;33(4):310-312.
5. Pindborg, JJ. Pathology of the dental hard tissues. 4th ed. Philadelphia: WB Saunders; 1970. p. 58-64.
6. Kronfeld R. Dens in dente. J Dent Res 1934;14:49-66.
7. 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 Nov;10(11):1204-1218 contd.
8. Kalaskar R (Department of Pedodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India. riteshpedo@rediffmail.com), Kalaskar AR. Nonsurgical treatment of periapical lesion associated with type III dens invaginatus using calcium hydroxide: a case report. J Indian Soc Pedod Prevent Dent 2008;26 Suppl 2:S72-75.
9. Vajrabhaya L. Nonsurgical endodontic treatment of a tooth with double dens in dente. J Endod 1989 Jul;15(7):323-325.
10. Gotoh T, Kawahara K, Imai K, Kishi K, Fujiki Y. Clinical and radiographic study of dens invaginatus. Oral Surg Oral Med Oral Pathol 1979 Jul;48(1):88-91.
11. Moradi S (Department of Endodontics, Dental School, Mashad University of Medical Sciences, Mashad, Iran), Donyavi Z, Esmaeiazade M. Nonsurgical root canal treatment of dens invaginatus 3 in a maxillary lateral incisor. Iran Endod J 2008 Spring;3(2):38-41. Epub 2008 Apr 2.
12. Costa WF (Faculdade de Odontologia de Ribeirão Preto, Universidade de São Paulo), Sousa Neto MD, Pecora JD. Upper molar dens in dente—case report. Braz Dent J 1990;1(1)45-9.
13. Holan G (Department of Paediatric Dentistry, The Hebrew University-Hadassah School of Dental Medicine, Jerusalem, Israel). Dens invaginatus in a primary canine: a case report. Int J Paediatr Dent 1998 Mar;8(1):61-64.
14. Canger EM (Department of Oral Diagnosis and Radiology, Ondokuz Mayıs University, Samsun, Turkey. emcanger@omu.edu.tr), Kayipmaz S, Celenk P. Bilateral dens invaginatus in mandibular premolar region. Indian J Dent Res 2009 Apr-Jun;20(2):238-40. doi: 10.4103/0970-9290.52887.
15. Mupparapu M (Division of Oral and Maxillofacial Radiology, Department of Diagnostic Sciences, New Jersey Dental School, Newark 07101-1709, USA), Singer SR. A review of dens invaginatus (dens in dente) in permanent and primary teeth: report of a case in a microdentic maxillary lateral incisor. Quintessence Int 2006 Feb;37(2):125-9.
16. Eden EK (Department of Pedodontics, Ege University, School of Dentistry, 35100 Bornova/Izmir/Turkey), Koca H, Sen BH. Dens invaginatus in primary molar: Report of case. ASDC J Dent Child 2002 Jan-Apr;69(1):49-53, 12.
17. Hovland EJ, Block RM. Nonrecognition and subsequent endodontic treatment of dens invaginatus. J Endod 1977 Sep; 3(9):360-362.
18. Ridell K (Department of Paediatric Dentistry, Faculty of Odontology, Malmö University, Carl Gustafs väg 34, SE-214 21 Malmö, Sweden), Mejare I, Matsson L. Dens invaginatus: A retrospective study of prophylactic invagination treatment. Int J Paediatr Dent 2001 Mar;11(2):92-97.
19. Rabinowitch BZ. Dens in dente: primary tooth; report of a case. Oral Surg Oral Med Oral Pathol 1952 Dec;5(12):1312-1314.
20. Kupietzky A. Detection of dens invaginatus in a one-year old infant. Pediatr Dent 2000 Mar-Apr;22(2):148-50.

ABOUT THE AUTHORS

Arpana V Bansal (Corresponding Author)

Reader, Department of Pedodontics and Preventive Dentistry, People's Dental Academy, Bhanpur Bypass Road, Bhopal-462010, Madhya Pradesh, India, e-mail: varpana@yahoo.com

Abhinav Bansal

Reader, Department of Periodontics, People's College of Dental Sciences and Research Centre, Bhopal, Madhya Pradesh, India

Vinaya Kumar Kulkarni

Associate Professor, Department of Pedodontics and Preventive Dentistry, People's College of Dental Sciences and Research Centre, Bhopal, Madhya Pradesh, India

Reema Sharma Dhar

Reader, Department of Pedodontics and Preventive Dentistry Gurunanak Institute of Dental Sciences and Research, Kolkata, West Bengal, India