Case Report

University J Dent Scie 2022; Vol. 8, Issue 2

Non-Surgical Management of Dens Invaginatus with A Large Periapical Lesion with The Aid of CBCT.

Abstract:
Maxillary lateral incisors show a high incidence of anatomic variation Dens Invaginatus is a developmental anomaly of teeth characterized by infoldings of enamel, dentin and extend up to the apex. Such a condition is often associated withdental caries, pulpal and periodontal pathology. Root canal treatment of this abnormality is considered difficult due to the complex anatomy. This article discusses case report of a tooth with Dens Invaginatus with emphasis on correct diagnosis, treatment planning and nonsurgical healing with no extra intervention of a large periapical lesion associated with invaginated tooth.

Keywords: Dens Invaginatus, CBCT, Nonsurgical treatment,Calcium Hydroxide

Introduction:

Dens invaginatus is a rare tooth malformation caused by infolding of enamel organ into adjacent dental papilla during tooth development.[1] The etiologyis could be focal growth retardation, focal growth stimulation or localized external pressure in certain areas of the tooth bud. [2-4]In a radiograph it presents as a radiopaque invagination, extending from cingulum into root canal. Unusual crown morphology like dilated, peg shaped or barrel shaped teeth may raise a suspicion. The prevalence of dens invaginatus has been reported to be between 0.3–10%. Permanent maxillary lateral incisors are the most frequently involved teeth.

The most commonclassification proposed by Oehlers, categorizes invaginations into three classes as determined by how far they extend radiographically from the crown into the root.[5]

Type I: The invagination is confined within the crown of the tooth and does not extend beyond the level of cemento-enamel junction.

Type II: The invagination extends into the pulp chamber but remains within the root canal with no communication with the periodontal ligament

Access this article online

Website: www.ujds.in

Quick Response Code

DOI: https://doi.org/10.21276/ujds.2022.8.2.16

Type IIIA: The invagination extends through the root and communicates laterally with the periodontal ligament space through a pseudo-foramen. There is usually no communication with the pulp, which lies compressed within the root.

Type IIIB: The invagination extends through the root and communicates with theperiodontal ligament at the apical foramen. There is usually no communication with the pulp.

An early diagnosis is crucial as invagination is inaccessible to oral hygiene procedures, and patients might present with pulpal or periapical periodontal symptoms of.Various techniques are employed for treating dens Invaginatus: conservative restorative treatment, non-surgical root canal treatment, endodontic surgery, intentional replantation and extraction. [6-9]

[1]SMITA AGRAWAL [2]NIKITA DHINGRA, [3]SHIVANI MATHUR
[1-3]Department of Pediatric and Preventive Dentistry, ITS-CDSR, Muradnagar, Ghaziabad

Address for Correspondence: Dr. Smita Agrawal
M.D.S (PG- 3rd year)
Department of Pediatric and Preventive Dentistry
ITS-CDSR
Muradnagar, Ghaziabad
Email : Nikitadhingra14@gmail.com

Received : 1 Feb., 2022, **Published :** 30 June, 2022

How to cite this article: Smita Agrawal. (2022). Non-Surgical Management Of Dens Invaginatus With A Large Periapical Lesion With The Aid Of CBCT. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 8(2). 87-90

The anatomy of dens invaginatus is so complex that conventional two-dimensional radiographs might not yield sufficient diagnostic information which hinders the effective management of the tooth. Through Cone beam computed tomography (CBCT), images can be reconstructed using significantly lower radiation doses compared with the alternative conventional computed tomography.10The purpose of the present clinical article is to demonstrate the use of CBCT as an effective diagnostic tool for the management of a large periapical cyst associated with a tooth containing dens invaginatus type II.

Case report :

A healthy 21-year-old male patient with noncontributory medical history came with a complaint of swelling in the upper right front tooth region. He gave a history of acute pain and swelling several times periodically for the last 5 yearsand was prescribed antibiotics each time. No history of dental trauma reported.

Clinical examination revealed a diffused swelling extending from 11 to 13 with a sinus opening in the labial sulcus of 12. While there was no signs of caries or restoration, a prominent cingulum was seen on the palatal surface of 12 (fig.1). It was also observed that the mesiodistal dimensions of 12 was visibly larger than the contralateral tooth. The tooth was tender to percussion, periodontal probing depths were within normal limits and thermal and electric vitality tests were found to be negative. Radiographic examination revealed a complicated crown and root morphology associated with tooth 12 suggestive of invaginatus (fig.2).

Fig1 Fig 2

Morphology of the invagination was not clear from the diagnostic parallax radiographs, so a small volume CBCT scan of the tooth was advised to aid in the diagnosis and appropriate treatment protocol. A small volume CBCT scan of the area of interest with exposure parameters of 80 kV, 3.0 mA and 17.5 s were taken. Careful examination of cross-sectional images of the invaginated tooth in all the orthogonal planes confirmed the presence of a class II dens invaginatus. The invagination was located distopalatal to the main canal reaching upto apical third of the root not communicating with the pulp space or the root canal but confined as a blind sac and appeared to be lined entirely with enamel. At the apex of the invagination, the surrounding pulp space ballooned out into the walls of the root before tapering to the tooth's true apical foramen. A well-defined periapical lesion of approximate dimension of 9*13 mm was present which caused thinning of labial and lingual cortical plates along with thinning of floor of nasal cavity (fig.3,4).

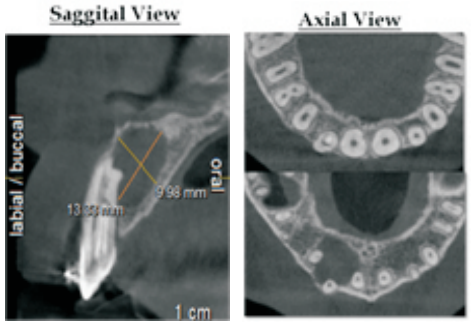
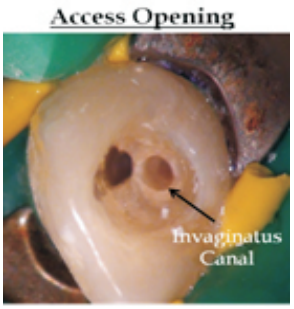


Fig3 Fig4

A decision was made to initiate endodontic therapy followed by surgical intervention. Endodontic treatment was carried out under rubber dam isolation(fig.5). Upon access and negotiation of the dens with hand files (Dentsply Maillefer, Ballaigues, Switzerland), drainage of serous fluid from the main canal was established, which was allowed to drain and settle after instrumentation. The base of the invagination was explored with progressively smaller hand files (sizes 15, 10, 08 and 06). The walls felt smooth when probed gently, and there was no apparent breach in the integrity of what appeared to be an enamel-lined pouch. Working length of main canal and invaginatus canal was established separately and the canal was chemomechanically debrided with hand files using copious irrigation of 1% sodium hypochlorite solution (fig.6). The irrigant was agitated for one minute using an ISO size 15 K-type ultrasonic file (Dentsply Maillefer). After cleaning and shaping, the main canal was dried and calcium hydroxide paste (metapex) was extruded for the healing of periapical lesion (fig.7). The canal was then sealed with a sterile cotton

pellet and IRM (Dentsply Maillefer). Dressing was changed every 2 months. After 4 months, there was substantial reduction in the size of lesion, so we decided to treat it non-surgically (fig.8). Before obturation, in order to confirm the radiographic findings, CBCT imaging was again done. It revealed substantial reduction in the size of lesion, thickening of cortical plates and bony trabeculae formation within the lesion (fig.9). The calcium hydroxide dressing was removed and the pulp cavity was cleaned cautiously and dried. Main canal was obturated with warm vertical compaction followed by backfill with using the rmoplastisized gutta percha while invaginatus canal was obturated with lateral compaction (fig.10). The patient was reviewed 2 years later. Tooth 12 was asymptomatic and radiographically there was reduction in the size of the periradicular lesionwith the signs of healing (fig.11).



b Fig5

Fig6

Fig7

Fig8

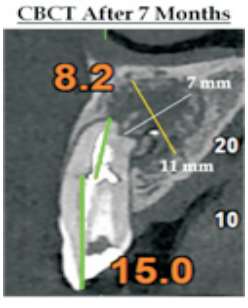


Fig7

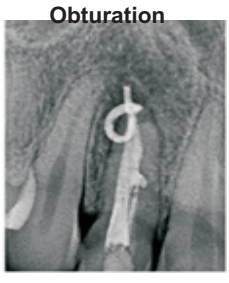


Fig8

Fig 11.

Discussion:

Procuring knowledge of variations in root canal configuration and meticulous diagnosis can prevent many root canal treatment failures. The teeth affected with dens invaginatus are associated with an increased risk of developing pulpal problems even without any evidence of caries or history of trauma. Such teeth are susceptible to caries because deep pits act as places of stagnation. Diagnostic yield of conventional radiographs is greatly reduced by geometric distortion, anatomical noise and the compression of three-dimensional structures into a two-dimensional image. [11,12] Cone-beam computed tomography (CBCT), allows three-dimensional imaging of dental structures thereby aiding in the diagnosis of complicated canal anatomies. 13In this case, contemporary three-dimensional radiographic techniques enabled accurate morphology of the invagination, size of the lesion and its approximation to the important anatomical landmarks.

Root canal treatment is on similar tangent as surgery. Both believe in debridement of the necrotic and conservation of the tissue that can heal. The requirement for successful endodontic treatment is the complete removal of all irritants from the root canal system followed by its obturation with a biocompatible material. When treating such cases, it is essential to know the course of invagination and its relation to the main canal for proper instrumentation, chemomechanical preparation, and the technique to fill the main canal and invaginatus. Root canal was irregular in cross-section, with wave-like constrictions and dilatations. For these reasons, a variety of techniques or materials are chosen for the most appropriate removal of necrotic tissue and bacteria. Sodium hypochlorite was agitated ultrasonically to allow it to penetrate the space around the invagination and the use of warm vertical condensation of gutta-percha ensured compact filling into the major irregularities within the root canal system.

Non surgical treatment with periapical extrusion of calcium hydroxide paste was chosen to treat this case. Over-instrumentation1 mm beyond the apical foramenallows drainage of the cystic fluid,degeneration of the epithelial cellsand the inflammatory reaction that developsdestroys the cyst lining and converts the lesion intoa granuloma. Once the causative factors areeliminated the granuloma heals spontaneously.[14-15]

Calcium hydroxide is a widely usedmaterial because it is bactericidaland stimulates hard tissue repair.16Directcontact between the calcium hydroxide and theperiapical tissue was beneficial forosseoinductive reasons.[17] The action of calcium hydroxidebeyond the apex may be fourfold: (i) anti-inflammatory activity (ii) neutralization of acidproducts (iii) activation of the alkaline phosphatase(iv) antibacterial action.[18]

With CBCT there is an increased radiation exposure to the patient when compared to periapical radiographs. So,the effective radiation dose to the patient must be as low as reasonably achievable (ALARA), justified and optimized.19-20 For this reason, a small volume CBCT scan was prescribed in this case. In this case, proper treatment could not have been accurately planned and deliveredsuccessfully without the aid of CBCT images thus making it a viable tool for endodontic diagnosis and treatment planning.

References :

1. Hulsmann M (1997) Dens invaginatus: aetiology, classification, prevalence, diagnosis, and treatment considerations. International Endodontic Journal 30, 79–90.
2. Kornfeld R (1934) Dens in dente. Journal of Dental Research 14, 49–66.
3. Rushton MA (1937) A collection of dilated composite odontomas. British Dental Journal 63, 65–85.
4. Atkinson SR (1943) The permanent maxillary lateral incisor. American Journal of Orthodontics 29, 685–98.
5. Oehlers FA (1957a) Dens invaginatus. I. Variations of the invagination process and associated anterior crown forms. Oral Surgery, Oral Medicine, and Oral Pathology 10, 1204–18.
6. de Sousa SM, Bramante CM (1998) Dens invaginatus: treatment choices. Endodontics and Dental Traumatology 14, 152–8.
7. Bolanos OR, Martell B, Morse DR (1988) A unique approach to the treatment of a tooth with dens invaginatus. Journal of Endodontics 14, 315–7.
8. Lindner C, Messer HH, Tyas MJ (1995) A complex treatment of dens invaginatus.
9. Endodontics and Dental Traumatology11, 153–5.
10. Cohenca N, Simon JH, Marhtur A, Malfaz JM (2007) Clinical indications for digital imaging in dentoalveolar trauma. Part 2: root resorption. Dental Traumatology 23, 105–13.
11. Bender IB, Seltzer S (1961) Roentgenographic and direct observation of experimental lesions in bone: Journal of the American Dental Association 62, 152–60.
12. Webber RL, Messura JK (1999) An in vivo comparison of diagnostic information obtained from tunedaperture computed tomography and conventional dental radiographic imaging modalities. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology 88, 239–47.
13. Vannier MW, Hildebolt CF, Conover G, Knapp RH, Yokoyama-Crothers N, Wang G (1997) Threedimensional dental imaging by spiral CT. A progress report. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology 84, 561–70.
14. Bhaskar SN. Non-surgical resolution of radicular cysts. Oral Surg Oral Med Oral Pathol 1972; 34:458-68.
15. Bender IB. A commentary on General Bhaskar's hypothesis. Oral Surg Oral Med Oral Pathol 1972; 34, 469–76.
16. Fernandes M, De Ataide I. Nonsurgical management of a large periapical lesion using a simple aspiration technique: A case report. Int Endod J 2010; 43:536-42.
17. Ghose LJ, Baghdady VS, Hikmat BYM Apexification of immature apices of pulpless permanent anterior teeth with calcium hydroxide. J Endod 1987; 13:285–90.
18. Sousa SMG, Bramante CM. Dens invaginatus: treatment choices. Endod Dent Traumatol 1998; 14: 152–8.
19. Song CK, Chang HS, Min KS (2010) Endodontic management of supernumerary tooth fused with maxillary first molar by using cone-beam computed tomography. Journal of Endodontics 36, 1901–4.

Farman AG (2005) ALARA still applies-editorial. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontics 100, 395–7.