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## Multidisciplinary management of apical fenestration by dens invaginatus: Report of a clinical case

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### Abstract

Dens invaginatus is a developmental anomaly that results in an invagination of the enamel organ into the dental papilla prior to calcification of the dental tissues. Apical fenestration is defined as a defect in which the apices perforate the mucosa and are exposed to the oral cavity. These anomalies require a multidisciplinary management in order to give a better prognosis to the patient, since it acts as a retentive area of biofilm, affecting and deteriorating pulp and per radicular health. In this article we present a clinical case of apical fenestration by dens invaginatus in right upper lateral incisor, we describe different techniques for its management in which the participation of two specialties is incorporated: endodontic and periodontics, with the aim of recovering periodontal and per apical health.

**Keywords:** Dens invaginatus, fenestration, apical fenestration, apicectomy, gingival incision

### Introduction

Dens invaginatus is a developmental anomaly that results in a deepening or invagination of the enamel organ in the dental papilla before calcification of the dental tissues [1]. Its prevalence ranges from 0.04 to 10%, being more recurrent in the upper incisors. The finding of dens invaginatus is more common in men than in women with a 2:1 ratio [2, 3, 4].

Several classifications have been described, however Oehlers, in 1958, classified them according to the radiographic level of the root involved; type I: it is confined within the clinical crown and does not extend beyond the level of the amelocemental junction, type II extends into the pulp chamber, but remains within the root canal without communication with the periodontal ligament; type IIIA: extends through the root and communicates laterally with the periodontal ligament space, and type IIIB: the invagination extends through the root and communicates with the periodontal ligament at the apical foramen. (Figure 1) [1, 12]. Early diagnosis requires thorough clinical knowledge, advanced radiographic evaluation, use of Cone Beam Computed Tomography (CBCT) and microscopy, which dictate the success of endodontic treatment of such teeth.

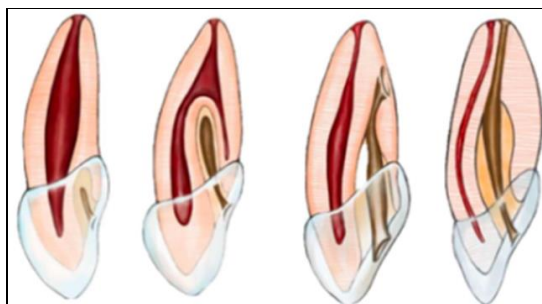


Fig 1: Classification -Dens Invaginatus (Oehlers 1958)

Yang defines fenestration as a defect or bony window through which the root of the tooth emerges, and it is considered labial, mucosal, or apical fenestration when the apices perforate the mucosa and are exposed to the oral cavity [6]. Its etiology can be multifactorial, due to caries, trauma, restoration, root anatomy, developmental anomalies, chronic per apical pathologies, malocclusion [7].

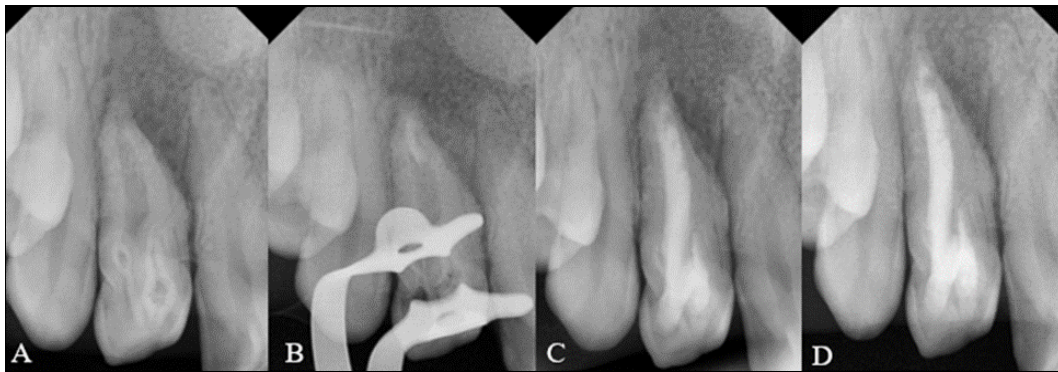
**Clinical Case**

28-year-old female patient, systemically healthy, who came for dental consultation to the Periodontics Clinic of the Autonomous University of Coahuila, Torreón Unit, referring to her main reason for consultation as "I have a small hole in my gum". The clinical examination revealed malocclusion, fluorosis, apical fenestration on the buccal side of the right upper lateral incisor, accumulation of bacterial plaque dental calculus and erythematous area around this dental organ. (Figure 2).



**Fig 2:** Shows the initial clinical photograph of the patient with the Erythematous lesion on the buccal side of the right upper lateral incisor

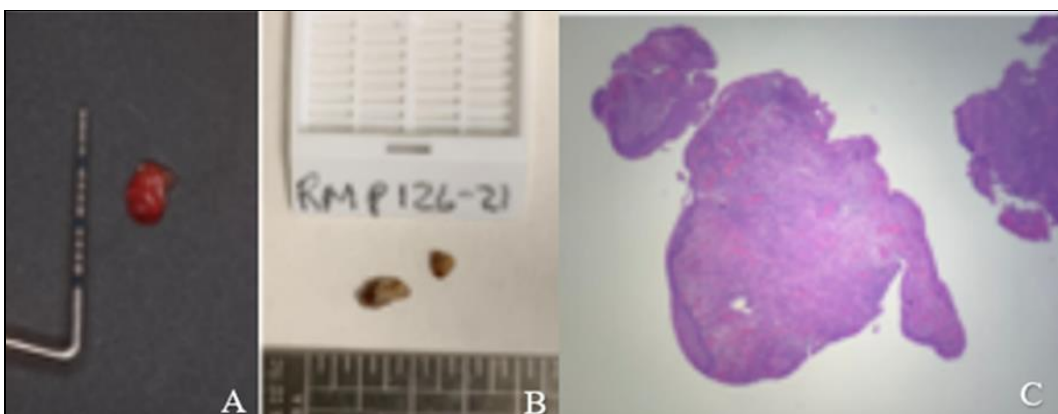
Radio graphically, we detected a radiolucent area at the apical level that is compatible with a chronic apical abscess, and the presence of double invagination, one confined within the crown and the second extending through the root and communicating laterally with the periodontal ligament. (Figure 3 A, B, C, D).



**Fig 3:** A) Initial per apical radiograph of right upper lateral incisor showing per apical lesion and the presence of a double Invagination (class I and III); B) Apical sealing with MTA. C) Filling with gutta-percha continuous wave technique. D) Radiographic control at one month

Due to the inflammation and the erythematous area around the right upper lateral incisor, it was decided to perform dental prophylaxis and scaling and smoothing in the area. Due to the fact that the lesion did not diminish, it was decided to have the erythematous tissue analyzed, for which an

incisional biopsy was obtained, which in the histopathological analysis was diagnosed as a chronic inflammatory process, caused by the fenestration and the presence of an apical lesion. (Figure 4)



**Fig 4:** A) The sample obtained from the lesion can be observed. B) Labeled sample. C) Histopathological photograph

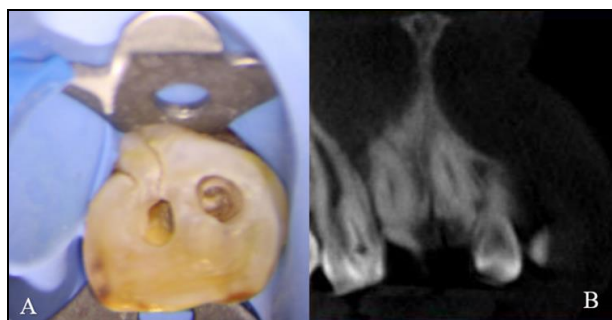
The patient was referred to the Endodontic Department for evaluation based on the classification of the American Association of Endodontic (AAE) suggested as "pulp necrosis with chronic apical abscess" and according to Ohelers classification as dens invaginatus class I and III. Therefore, the definitive diagnosis was primary endodontic disease with secondary periodontal involvement in the right upper lateral

incisor, which is located 1/3 outside the vestibular table.

**Endodontic Management**

At the first appointment, an ultraconservative endodontic access (truss access) was performed using CBCT and microscopy (Figure 5). It was instrumented with K-flex hand files, as recommended by Ohelers, intra-canal medication (Ultra Cal) was placed. In the second appointment, a final

irrigation protocol was final irrigation medication was placed and an apical seal was placed with Mineral Trioxide Aggregate (MTA). At the third appointment, final obscuration was performed with the continuous wave technique (Figure 3C).



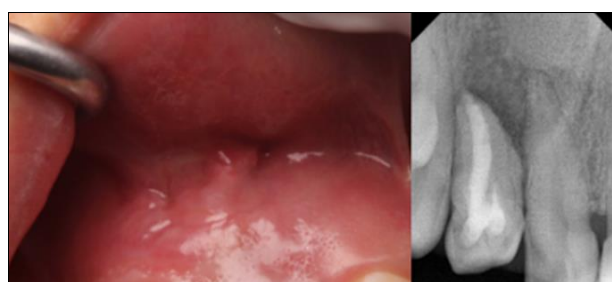
**Fig 5:** A) Truss Access; B) Cone Beam Computed Tomography (CBCT)

### Surgical phase

For the planning of the surgical phase, the fenestration was evaluated topographically, which resulted in a bone fenestration of 7 mm. A semilunar flap was designed and extended from upper right central incisor to first upper right premolar to have a good visibility and preserve the interdental papillae. Due to the length of the fenestration and according to the planning previously reviewed, a 5 mm root resection was made from the apex leaving a straight cut with respect to the axial axis to ensure the least amount of filtration; followed by a 3 mm box and retrograde obscuration with MTA (Figure 6). Finally, to cover the 2 mm that were exposed, a 7x20 mm free gingival graft was obtained from the palatal area, simple stitches were made to suture the graft to the periosteal with Vycril 4-0 and then horizontal mattress stitches with Nylon 4-0.



**Fig 6:** A) 5 mm resection of the apex with diamond bur. B) Retrograde Obscuration with MTA. C) Free epithelial graft obtained from the palate. D) Free epithelial graft sutured with simple stitches and horizontal mattress in the recipient bed



**Fig 7:** Clinical and radiographic control 3 months after surgery and free gingival graft

### Discussion

The incidence of dens invaginatus ranges from 0.04 to 10%. In the article by Alani 2008<sup>[5]</sup> he reported a predilection for the male gender and the lateral incisor (5); in our work we show a lateral tooth but of female gender, which makes it a case with a lower incidence. In 2004 Hamasha and Al-Omari 2004 found a class I dens invaginatus in the upper left lateral incisor and recommended the use of CBCT as a diagnostic aid for treatment planning (8).

The treatment of the dens invaginatus should be individualized in each case, depending on the endodontic and periodontal characteristics and the classification in which it is found. In our patient manual files were used as recommended by Heelers, since he mentions avoiding the use of rotary instrumentation, due to the complex anatomy of these types of teeth, which can increase the risk of fracture of the instrument (9). Irrigation was handled meticulously, leaving two millimeters before the working length. Rosas 2021 reported a high rate of accidents with hypochlorite in teeth with apical fenestrations (10). Smith recommends the use of plasticized gutta percha technique for this type of classification, which agrees with our treatment (9).

### Conclusion

Dens invaginatus and apical fenestration require multidisciplinary management in order to give a better prognosis to the patient, since it acts as a biofilm retentive area, affecting and deteriorating pulp and per radicular health. The present case describes a rare situation in which a mucosal fenestration developed in the right upper lateral incisor due to chronic per apical inflammation caused by dens invaginatus, which was successfully treated with a combination of periodontics and endodontic with a combination of root canal treatment, apicectomy and free gingival graft, is a viable treatment to reestablish periodontal and per apical health.

### References

- Hülsmann M. Dens invigilates: etiology, classification, prevalence, diagnosis, and treatment considerations. *Int Endod J.* 1997;30:79-90.
- Thakur S. Den's invaginatus (tooth within tooth): a review of the literature and diagnostic and management guidelines for practicing dentists. *Indiana J Dent Sci.* 2012;4 (3):111-116.
- Avery JK, Chiego Jr D. *Principios de histología y embriología bucal con orientación clínica.* 3a ed. Mosby Elsevier; c2007.
- Oehlers FA. Dens invigilates (dilated composite Odon tome). I. Variations of the invagination process and associated anterior crown forms. *Oral Surg Oral Med Oral Pathology.* 1957;10(11):1204-1218.
- Alani A, Bishop K. Den's invigilates. Part 1: classification, prevalence and etiology. *Int Endod J.* 2008;41(12):1123-1136.
- Yang Z-P. Treatment of labial fenestration of maxillary central incisor. *Dental Traumatology.* 1996;12(2):104-108.
- Singh S, Panwar M, Arora V. Management of mucosal fenestration by multidisciplinary approach: A rare case report. *Med J Armed Forces India.* 2013;69(1):86-89. DOI: 10.1016/j.mjafi.2012.02.006. Epub 2012 Jul 17. PMID: 24532944; PMCID: PMC3862956.
- Hamasha AA, Alomari QD. Prevalence of dens invigilates in Jordanian adults. *Int Endod J.* 2004;37(5):307-10.

DOI: 10.1111/j.0143-2885.2004.00797.x.

PMID: 15086751.

9. Alani A, Bishop K. Den's invaginations. Part 2: clinical, radiographic features and management options. *Int Endod J.* 2008;41(12):1137-1154.
10. Souza EM, Campos MG, Rosas Aguilar R. Mapping the perplex anatomical pattern of teeth involved in sodium hypochlorite accidents: a cross-sectional quasi-experimental study. *International Endodontic Journal.* 2021;54(8):1212-1220.
11. Ahmed H, Dummer P. A new system for classifying tooth, root and canal anomalies. *International Endodontic Journal.* 2017;51(4):389-404.
12. Pastoriza A, Peña A, Sierra A, Boquete A, Granero JM. Manejo de un dens invaginatus: Revisión de la literatura. *Revista Científica PGO.* 2020;4:1-5.

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