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Management Of A Periradicular Lesion On An Invaginated Maxillary Lateral Incisor: A Case Report

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Abstract

Dens invaginatus is a rare developmental morphoanatomical variation affecting mainly the maxillary lateral incisors. This malformation likely originates from an infolding of the enamel organ into the dental papilla during tooth development.

As a result, the root canal system of dens invaginatus is characterized by morphologic and anatomic complexity, thus, the diagnoses and treatment planning of such cases is considered difficult too often condemned in the past to extraction.

This report describes non-surgical endodontic treatment dens invaginatus in a maxillary lateral incisor with periradicular lesion which allowed to preserve the affected tooth in the dental arch.

Keywords

Dens Invaginatus, Periradicular lesion, Endodontic Treatment, Case report.

Introduction

Dens invaginatus or "tooth within a tooth" is a tooth developmental malformation resulting from a partial invagination, of variable depth, of the enamel organ into the dental papilla, before calcification is complete.[1]The progression of this anomaly gives rise to an invagination bordered by enamel within the crown or root of the tooth.[2]

The exact aetiology of dens invaginatus is unknown, although a genetic cause is probably the most likely factor.[3]Oehlers 1957classified dens invaginatus into three types based on the degree of invagination. Type I dens invaginatus is an invagination restricted to the crown. Type II extends past the cement-enamel junction, but does not involve periapical tissues. Type III

invagination exceeds the limit of the cement-enamel junction generating a second foramen.[4]

Teeth with invaginations are more susceptible to earlycaries, because deep pits and irregularities act as a place for microorganism colonization and substrate stagnation.[5]Bacteria from the oral cavity can contaminate and propagate within these malformations, leading to the development of early caries and consequently pulp andperi-radicular pathology.[3]

In this case, the root canal treatment is considered in order to disinfect the endodontic system, which is complicated by the difficulty of access and complex root canal morphologic variations which make the management of infected dens invaginatus a challenge.[6]

The aim of the present clinical report is to describe the endodontic management of a necrotic maxillary lateral incisor presenting dens invaginatus with open apex and periapical pathosis and to discuss the treatment decision.

Case Presentation

A 21-year-old female patient was referred for endodontic treatment because of a vestibular sinus tract in the periapical area around the maxillary left lateral incisor. The medical history of the patient was not remarkable. She had no history of allergy or medication. The patient reports a history of repeated swelling in the vestibular region of the tooth 22 without a previous trauma.

The intraoral examination showedcaries in cingulum which is prominent and almost a ‘‘double tuberculum’’(Fig.1)and a vestibular sinus tract in the periapical area(Fig.2).The axial percussion and digital palpation in the periapical region revealed a positive response A negative response to pulp sensitivity test occurred in the tooth.

Radiographic examination revealed that the tooth 22 showed an abnormal morphology with an invagination (Oehlers’ type I) extending for approximately 3 mm with radiolucent lesion around the periapical andthe distal lateral region. Apical radiographic examination showed an open root apex with a diameter of >1.0 mm(Fig.3).

After a comprehensive discussion of the treatment decision, the tooth was isolated with a rubber dam. The access cavity was prepared using a cavity access Z set (Dentsply Sirona Endodontics; Ballaigues, Switzerland), and a double orifice was disclosed(Fig.4). Operative working length was determined by periapical radiographic with the files in place (Fig.5).

Periapical radiographic with the files in place was taken to determine operative working length and to visualize the extension of the invagination.Then,the pseudo root canal invaginated was instrumented with K-files and removed by Gates Glidden burs to create a single canal space(Fig.6).

The root canal was cleaned and shaped with Protaper nickle-titaninm rotary files(Dentsply Maillefer, Ballaigues, Switzerland)and flushed copiously with 2.5% sodium hypochlorite solution. After completion of chemomechanical preparation the root canal was dried with sterile paper points. No bleeding was observed either during initial access preparation or after root canal disinfection.

Freshly mixed calcium hydroxide paste was prepared and delivered to the canal with a past inject Pastinject (MicroMega, France). The coronal access was sealed using glass ionomer filling material (GI) (Vitrebond; 3M, MN, USA). The patient was scheduled for clinical evaluation and further treatment after 4 weeks.

At the second visit, the sinus tract had disappeared, and the tooth was asymptomatic. The temporary restorative materials were removed under rubber dam isolation. Irrigation with 2.5% sodium hypochlorite solution and passive ultrasonic irrigation files (Irrisafe ,Satelec Acteon Group, Merignac, France)were used to remove the calcium hydroxide paste.

A final rinse of 1 minute was made using 5 mL of 17% EDTA, which was activated by an ultrasonic stream for 30 seconds. The EDTA was rinsed out using 5 mL of sterile saline solution. After drying with paper points, the root canal was obtured with calcium silicate-based bioceramic sealer BioRoot™ RCS (Septodont, France) and gutta-percha by lateral condensation followed by additional vertical condensation with warmed carriers (Fig.7). The access cavity was filled with resin composite (Fig.8).

The patient was asymptomatic when followed a week later. Tooth 22 was not tender on percussion or palpation. At 6 months of follow-up visit, a periapical radiograph revealed resolution of the periapical radiolucency (Fig.9).

Discussion

Dens invaginatus type I characterize an enamel invagination well delimited to the tooth crown. These lesions involve dentine and enamel, but do not extend past the cement-enamel junction or involve the pulp. In this case, the root and the apex development were disrupted by pulp necrosis and periapical pathosis.A few reportshad previously reported the simultaneous detection of open apex and dens invaginatus type I, suggesting that it is not a common event.[7]

Dens invaginatus requires early diagnosis and intervention, because it may quickly result in periradicular pathosis. The presence of invagination should be suspected, in the case an abscess or fistula without history of trauma or clinical evidence of caries or restorations.[8]

Conventional endodontic treatment of dens invaginatus is commonly difficult and complicated, particularly when large periapical lesions are associated.[9]The anatomical difficulties that can lead to endodontic failure and the lack of healing of peri-apical pathology.

The first difficulty of the cases of dens invaginatus is preparing the access cavity. The root canal debridement of the invagination is difficult, because of the unpredictable shape and narrow access.[10]The irregular volume of the root canal system makes proper cleaning and shaping difficult. Therefore, irrigation by means of ultrasonic activation has been suggested as an efficient method of disinfection.[11] In addition, the use of intra-canal medications such as calcium hydroxide, which had antimicrobial effect and tissue dissolving propertyis recommended.[12]

Most case reports on dens invaginatus case with open apices used MTA apical plug for root canal obturation, a few reports describe conventional gutta-percha obturation.[13,14]

In this case, root canal filling was carried out using the conventional gutta-percha technique without the use of MTA apical plug due to the narrower diameter (almost 1mm) which allows master cone adaptation. The sealing is carried out with a calcium silicate-based sealer in order to push sealer into minor irregularities and induce apical and peri-radicular healing thanks to its ability to achieve an excellent hermetic seal and osteoinductive capacity.[15]

The advantages of using this technique are the reduction of clinical time and cost since the entire canal is filled in the same session as well as the possibility of

removing root-canal filling materials in case of treatment failure.

Conclusion

The complex anatomy of these anomalies makes treatment procedures harder. Further followup of these cases should not be neglected to evaluate the treatment success.

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Figures

Fig. 1: Caries in cingulum which is prominent and almost a ‘‘double tuberculum’’

Fig. 2: Vestibular sinus tract in the periapical area

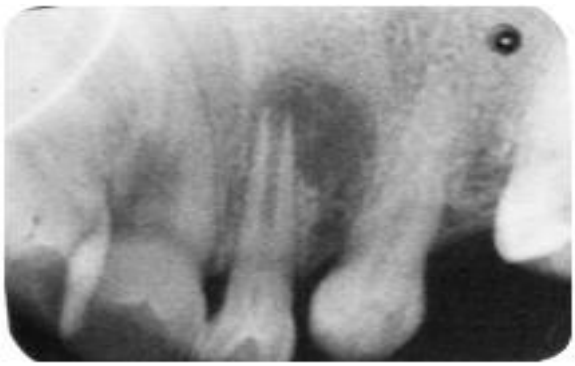

Fig. 3: Preoperative radiograph revealing the tooth 22 with an invagination type I with radiolucent lesion around the periapical and an open apex.

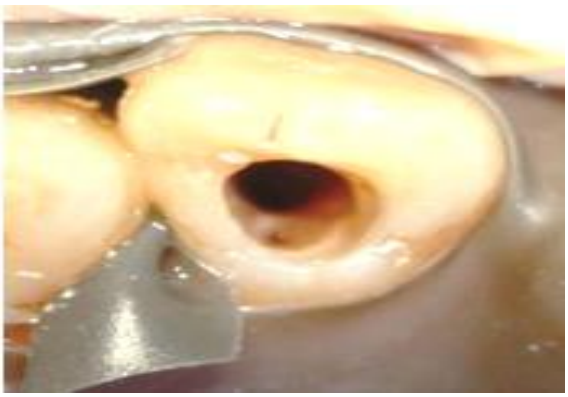

Fig. 4: Access opening revealing double orifice

Fig. 5: Working length and extension of the invagination was determined by periapical radiographic with the files in place

Fig. 6: Radiograph taken after the removal of the invaginatus

Fig. 7: Immediate postoperative periapical radiograph taken after obturation of root canal

Fig. 8: Access cavity was filled with resin composite

Fig. 9: Recall radiograph after 6 months showing advanced apical bone healing