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NON-SURGICAL ENDODONTIC MANAGEMENT OF TYPE II DENS INVAGINATUS IN MAXILLARY LATERAL INCISOR WITH IMMATURE APEX AND PERIAPICAL LESION: A CASE REPORT.

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ABSTRACT Dens invaginatus is a rare developmental anomaly most commonly affecting maxillary lateral incisors with wide morphological variations. Early diagnosis and proper treatment planning is critical for successful management of such cases. The aim of present case report is to describe successful management of Type II dens invaginatus in a maxillary lateral incisor with periapical lesion. The case was treated by using mineral trioxide aggregate (MTA) as an apical plug and obturating the remaining canal space with lateral compaction of gutta percha. Twelve months post-treatment clinical and radiographic follow up revealed absence of clinical symptoms and complete resolution of periapical lesion.

KEYWORDS : Dens invaginatus, lateral incisor, mineral trioxide aggregate, periapical lesion.

INTRODUCTION

Dens invaginatus is a rare dental anomaly occurring because of disturbances in morphogenesis resulting in deepening or invagination of the enamel organ into the dental papilla before calcification of the dental tissues. The anomaly was first described in 1856 by Socrates. Hallet, in 1953 introduced the term dens invaginatus and highlighted the inversion of the usual morphology of the tooth because of positioning of enamel centrally and dentine peripherally. [1,2]. The crown portion of the teeth affected with dens invaginatus can have normal morphology or unusual anatomy such as a greater buccolingual width, peg shaped form, barrel or conical shape and talon cusp. [3].

In 1957, Oehlers proposed the classification of dens invaginatus which is widely accepted. He categorized dens invaginatus into three types depending on the radiographic corono-radicular extension of invagination and the presence or absence of communication with the periodontal ligament. An enamel lined invagination confined to the coronal part of the tooth comes under Type I category. Type II represents extension of the invagination beyond the cemento-enamel junction ending as a blind sac which may or may not communicate with pulp and no definite communication with periapical tissues. Type III represents deep invagination perforating the lateral or apical surface of the root with no communication with the pulp [1,4].

The incidence of Type I and II dens invaginatus is 79% and 15% respectively and they are considered as incomplete invaginations while the incidence of Type III dens invaginatus which is considered as a complete invagination is about 5% [5,6]. The most commonly affected teeth are maxillary lateral incisors with high bilateral occurrence (43%) as reported by Hülsmann [1,7].

The present case report describes successful endodontic management of type II dens invaginatus affecting maxillary lateral incisor associated with a chronic periapical lesion.

CASE DESCRIPTION

A 28 yrs old male patient reported to the department of conservative dentistry and endodontics with chief complaint of pus drainage from front region of upper jaw since one month. Intraoral examination revealed presence of sinus tract associated with tooth 22 (Figure 1). The tooth gave negative response on cold thermal testing (Endo-Frost cold spray, Roeko; Coltene Whaledent, Langenau, Germany) and was not sensitive to percussion. A thorough clinical examination did not reveal any major morphologic alterations on the crown, except for a cusp-like prominent cingulum with a deep and slightly stained pit on the palatal aspect (Figure 2). Intraoral periapical radiographic examination revealed tooth in a tooth appearance with 22 along with incomplete root end formation and a diffuse periapical radiolucency (Figure 3). A three dimentional cone beam computed tomography (CBCT) revealed extension of the invagination beyond the cemento-enamel junction ending as a blind sac not communicating with pulp and periapical tissues.(Figure 4).

Considering the findings of clinical and radiographic investigations, a diagnosis of type II dens invaginatus associated with pulpal necrosis and a chronic periapical abscess was established and nonsurgical endodontic treatment was planned.

Procedure

After local anesthesia and rubber dam isolation, an access opening was made while keeping the original canal and invaginated portion separated (Figure 5). Working length was determined using radiographic method (Figure 6) and the root canal was instrumented with ISO-size 80 K-file (Dentsply Maillefer, Ballaigues, Switzerland). Copious irrigation was done with 2.5% sodium hypochlorite (NaOCl) along with ultrasonic agitation of the irrigant. The canal was dried with sterile paper points and a dressing of non-setting calcium hydroxide paste was given for 2 weeks (Meta Biomed Co., Ltd., South Korea).

In the second visit, calcium hydroxide was flushed out of the canal using 2.5% NaOCl irrigant. The final rinsing of canal was done with 17% ethylenediaminetetraacetic acid (EDTA) followed by drying with sterile paper points. The apical third and invaginated portion of the root canal was filled with mineral trioxide aggregate (MTA) (ProRoot® DENTSPLY Tulsa Dental Specialties, USA) (Figure 7). The remaining portion of the root canal was obturated using lateral compaction of gutta percha points and AH26 sealer (Dentsply Maillefer, USA) (Figure 8). The coronal portion of crown was restored with composite resin (3M™ ESPE™ Filtek™ Z250XT Universal Restorative). Twelve months follow up radiograph revealed complete resolution of periapical lesion with no clinical symptoms (Figure 9).

DISCUSSION

Early diagnosis and proper treatment planning is very essential in case of dens invaginatus to avoid pulpal and periapical infection through the invagination. Restoration of invagination, nonsurgical endodontic treatment, surgical endodontics, intentional replantation, regenerative endodontic procedure and extraction are several treatment options for management of tooth with dens invaginatus. [8,9] Nonsurgical root canal treatment of the main canal and invaginated portion as an isolated entity has shown predictable results when there is no communication between the pulp and the invagination.[10] The most important step during endodontic treatment of such cases is complete debridement and disinfection of the complex canal system. This can be

achieved by agitation of the irrigant using sonic or ultrasonic devices.[11] Calcium hydroxide was used as intracanal medicament in the present case because of its anti-microbial and tissue dissolving properties. [12] Furthermore, use of calcium hydroxide stimulates apical and periapical repair due to changes in pH in the root dentine.[13]

Obturation of teeth with incompletely formed roots is considered as a major challenge in endodontic treatment. Earlier, repeated use of calcium hydroxide dressings for longer periods was the preferred option for treatment of such cases.[14] But, because of longer duration of time for apical closure, one-step apexification using MTA apical plug became popular.[15] Complete healing of the periapical lesion require adequate biomechanical preparation, disinfection and three dimensional obturation of the root canal system. Several investigators have reported healing within the first year of completion of treatment [16] while some have found that healing could take a longer period of time.[17] In the present case, complete resolution of the periapical lesion was noticed after twelve months of treatment.

CONCLUSION

Dens invaginatus is a rare developmental anomaly most commonly affecting maxillary lateral incisors. Teeth affected with dens invaginatus are prone to bacterial contamination, pulp necrosis, periapical complications and open apex. The endodontic management of type II Dens invaginatus is always challenging because of complex anatomy especially in immature teeth. Early diagnosis, treatment planning and proper endodontic procedures will ensure complete resolution of pathology in such cases.

FIGURES

Figure (1): Sinus tract with 22.

Figure (2): Prominent cingulum and palatal pit with 22.

Figure (3) : Preoperative intraoral periapical radiograph

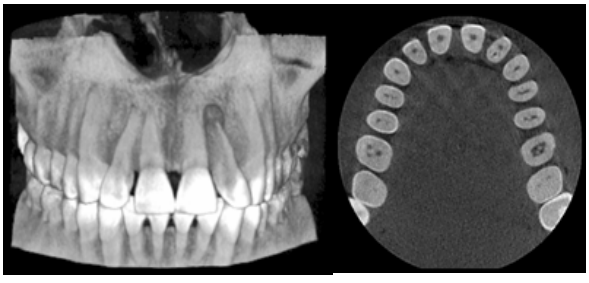

Figure (4) : CBCT images.

Figure (5) : Access cavity preparation .

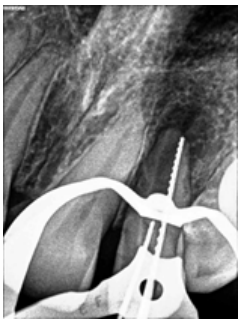

Figure (6) : Working length determination.

Figure (7) : MTA apical plug and obturation of invaginated portion

Figure (8) : Postobturation radiograph .

Figure (9) : Twelve months follow up.

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