CASE REPORT

Management of dens in dente associated with a chronic periapical lesion

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SUMMARY

Dens in dente is characterised as a developmental anomaly resulting from invagination of the enamel organ into the dental papilla. It is a rare malformation of teeth, showing a wide spectrum of morphological variations such as gemination, microdontia, taurodontism, dentinogenesis imperfecta, supernumerary tooth and hyperplasias, resulting frequently in early pulp necrosis. Maxillary lateral incisors are the commonest teeth to be affected by dental malformations—supernumerary tooth, talon cusp, congenitally missing tooth and dens in dente. We describe the management of a case of dens in dente in a maxillary lateral incisor with a periradicular lesion.

BACKGROUND

Dens in dente in a human tooth was first reported by Ploquet in 1794 and described by a dentist named 'Socrates' in 1856.¹ It is thought to occur when there is an infolding of the crown surface before calcification, resulting in variation in size and form during development of a tooth. This developmental malformation is also known as dens invaginatus, dilated composite odontome and dilated gestant odontome. It may occur in deciduous, permanent or supernumerary tooth and the reported incidence is estimated to range from 0.04% to 10%.² Males are affected more frequently than females, with a ratio of 3:1. Any teeth in the maxillary or mandibular arch may be affected, but the maxillary lateral incisors are the most frequently affected, followed by permanent central incisors, premolars, canines and molars.³⁻⁴ A bilateral occurrence of this condition is frequently observed and it has been reported in association with taurodontism, microdontia, gemination and dentinogenesis imperfecta.⁵⁻⁶ Oehler classified dens in dente in three categories according to the extension of the penetration and communication with the periodontal ligament or periapical tissues as degree 1, degree 2 and degree 3.⁷ Degree 2 is an enamel lined cavity invading the root, which may/may not communicate with the pulp. Such cases, if not treated appropriately, lead to rapid periapical involvement.

The patient is usually unaware of this condition and the anomaly is detected with the help of an intraoral periapical (IOPA) radiograph taken for any other indication. Radiological examination shows a radio-opaque invagination similar in density to enamel, extending into the central region of the crown at a variable distance from the tooth. The following case report describes the

management of a rare case of dens in dente in a maxillary lateral incisor associated with a chronic periapical lesion.

CASE PRESENTATION

An 8-year-old boy reported to the outpatient department of pedodontics with preventive dentistry, with pus discharge from the upper right anterior region for the past 6 months. Family and medical histories were found non-contributory. The dental history given by the patient revealed that the sinus would heal spontaneously, only to reappear in a few days. Extraoral examination revealed no significant findings. On intraoral clinical examination, the sinus was present in the periapical region of the upper right central incisor (tooth 12) with slight inflammation (figure 1). The presence of a discoloured pit on the lingual surface of tooth 12 was also noted. Radiological examination revealed a well-circumscribed radiolucent area at the undeveloped apex of the tooth, suggestive of a periapical pathological lesion (figure 2). When the IOPA radiograph was thoroughly examined, an identical tooth-like structure, resembling the typical appearance of dens in dente, was found in the root area close to the cemento-enamel junction. Based on these peculiar clinical and radiological features, a definitive diagnosis of dens in dente was established.

TREATMENT

In the present case, pulpal necrosis occurred before the root end closure of the affected tooth, leading to the development of periapical lesions. Also, IOPA X-ray revealed a large root canal with irregular volume and a lateral large opening of the root

Figure 1 Intraoral clinical examination showing sinus in relation to tooth 12.

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Figure 2 Intraoral periapical X-ray showing dens in dente with periapical lesion.

Figure 3 Direct exposure of periapical lesion.

DISCUSSION

Dens in dente is a dental anomaly that requires early diagnosis and intervention, and interferes with endodontic treatment. A deep lingual pit is often present on the tooth affected with dens invaginatus. The pit may be filled with soft tissue similar to dental follicles; the soft tissue becomes necrotic when the teeth erupt into the oral cavity.⁸ Permanent maxillary lateral incisors are the most commonly affected teeth followed by maxillary central incisors, premolars, canines and molars.⁹ Teixido *et al*¹⁰ highlighted the use of cone beam CT (CBCT) as an auxiliary tool for diagnosis and treatment planning of teeth with such developmental anomalies. If multiple separate canals are present in a tooth, they can be detected on CBCT along with their connections within the canal system.¹¹ The presence of dens in dente results in more difficult opening and shaping of root

canal at the root end, communicating with the periapical lesion and signs of type 2 invagination (Oehler's classification). An external root resorption was also evident. The possibility of trauma to the primary or permanent tooth could not be ruled out. All these facts taken together made it impossible to treat the root canal conventionally. Gaining access to the root canal end through root canal was too difficult. In such cases, the recommended treatment is apexification with calcium hydroxide. So it was decided to treat the periapical lesion by opening the flap.

Routine blood examinations of the patient were carried out, which were within normal limits. The procedure was performed under local anaesthesia. The root canal was opened, the necrosed pulp tissue removed and copious irrigation was performed. A mucoperiosteal flap was raised to reach the lesion; the periapical lesion was curetted (figure 3). After thorough removal of the periapical abscess, the wide immature apex was apically plugged with Vitapex paste to facilitate apical root closure. The remaining pulp chamber and canal root were thoroughly sealed with Vitapex (figure 4) and the flap was sutured routinely. The patient was re-called after 1 week for suture removal.

OUTCOME AND FOLLOW-UP

The sutures were removed after 1 week. The healing was uneventful. The patient was recalled every 3 months for follow-up evaluation, however, he did not follow-up.

Figure 4 Pulp chamber and root canal filled with Vitapex.

canals than in normal teeth.^{12 13} It can pose as a challenge for the clinician as teeth with invagination are more susceptible to caries because of the presence of deep pits and structural defects. These defects have malformed enamel and fine canals leading to communication with the pulp. Microorganisms have easy access through such communication, thereby causing infection and necrosis of the pulp. Clinically, the presence of dens invaginatus can be detected by unusual crown morphology, however, in some cases, the tooth may show no clinical features of any abnormal structure and might appear otherwise normal. In such cases, the anomaly is detected incidentally on a radiograph taken for another indication. In the present case, a lingual pit was present, through which microorganisms entered into the root canal, causing pulpal necrosis, which subsequently led to the development of the periapical pathology. The root end could not be closed because of the absence of vital pulp.

Different treatment options are available and the correct choice depends on the morphology of the involved tooth and severity of infection. These include non-surgical endodontic treatment, combined endodontic and surgical treatment, intentional replantation, extraction and pulp revascularisation. Revascularisation of the pulp space in a necrotic infected tooth with apical periodontitis is considered to be impossible, according to Trope.¹⁴ Moreover, it is a debatable procedure and has certain associated limitations such as absence of standard follow-up protocol; there have been long-term studies to assess outcomes such as the redevelopment of apical periodontitis and incidence of pulp canal obliteration.¹⁵ In open apex cases, the primary objective is to induce root formation by the use of chemicals, including calcium hydroxide pastes and mineral trioxide aggregate (MTA) barriers.¹⁶ In the present case, a combined surgical and endodontic treatment was carried out in an attempt to completely debride the periapical abscess.

The presence of dens in dente requires careful opening of the coronal chamber. In our case, after the apical foramen was opened, after debridement of the periapical abscess it was thoroughly plugged. This plug would make the canal shaping relatively safe and would improve the apical shape. The choice was made to use a Vitapex apical plug.^{13 17} However, triple antibiotic paste can be used as an alternative. It is a mixture of ciprofloxacin, metronidazole and minocycline paste (0.5 mg of each), as described by Takushige *et al.*¹⁸ This combination is capable of eliminating bacteria from infected dental tissues, as shown by previous studies.^{18 19–21}

Vitapex is preferably used as a root canal filling material in primary roots and furcal areas, because it is difficult to avoid the extrusion of filling materials beyond the root. Vitapex does not irritate and is harmless to the periapical tissues and permanent tooth germ.²² Vitapex readily adheres and is easily removed from the root canal if necessary, without discolouring the tooth. Vitapex showed strong antiseptic properties with no shrinkage; it is also radio-opaque. The calcium hydroxide component of Vitapex has a very high therapeutic index.

Although it is difficult to arrive at a particular consensus on the treatment of dens in dente with immature apices, using Vitapex in chronic periapical lesions along with surgical endodontics resulted in successful periradicular healing.

Learning points

- ▶ Dens in dente is a developmental anomaly that shows a wide range of the spectrum.
- ▶ The clinician should be aware of the presence of dens invaginatus as it has the potential of causing apical inflammatory disease.
- ▶ Treatment of dens in dente depends on the extent and severity of the lesion.

Competing interests None declared.

Patient consent Obtained.

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