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CASE REPORT

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Complete idiopathic resorption of distobuccal root of a maxillary first molar: A case report

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Key Clinical Message

This case report provides a rare case of idiopathic root resorption in maxillary first molar and suggests the importance of CBCT in the diagnosis and treatment outcome of complex endodontic diseases. Endodontic surgery is an effective method for treating teeth with persistent apical periodontitis.

Abstract

Idiopathic root resorption is an unexplained root resorption when the patient experiences root resorption without any local or systemic factors. Early diagnosis and appropriate treatment are crucial for long-term outcomes.

KEYWORDS

case report, endodontic surgery, maxillary first molar, root canal treatment, root resorption

1 | INTRODUCTION

Root resorption is a physiological or pathological process in which dentin and cementum gradually disappear under the continuous stimulation of osteoclasts. The physiological root resorption and shedding of deciduous teeth is essential for the eruption of permanent teeth.[1] Pathological root resorption is always harmful and often related to pulp or periapical diseases, trauma, orthodontics, stress, systemic diseases, and other factors.

Idiopathic root resorption is rare and usually occurs in patients with no significant history of trauma, orthodontic history, or periodontal surgery and in some patients with systemic disease. The etiology of idiopathic root resorption is unknown and may be related to feline herpesvirus 1, genetics, pregnancy, hormone levels, and genetic mutations.[2] This case reports a 52-year-old female with idiopathic resorption of the distal root of the right maxillary first molar. There was no obvious inducement, and the patient visited the dentist only after suffering pain.

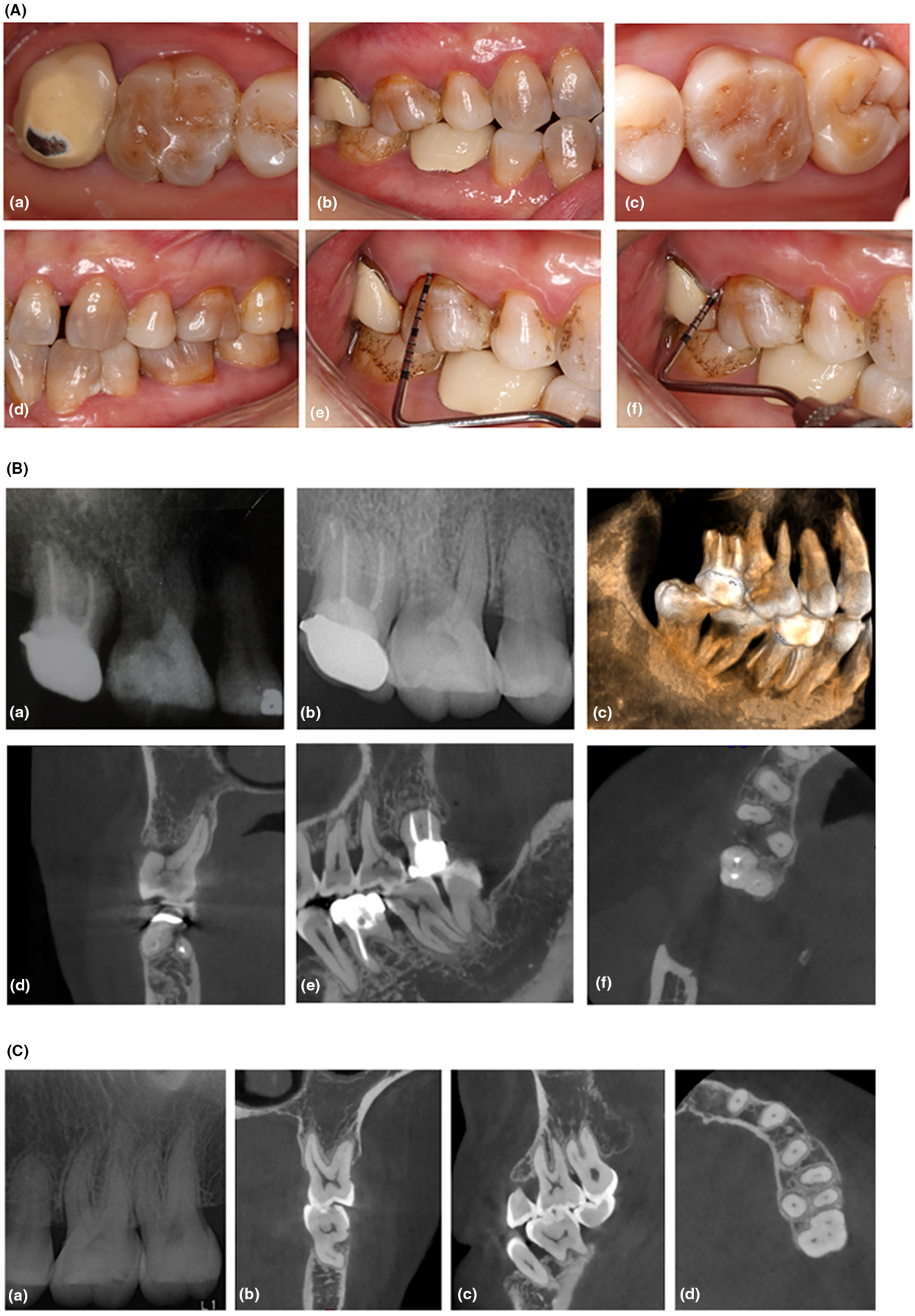
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FIGURE 1 Intraoral examination and radiological examination of Teeth 16 and 26 before treatment. (A) Intraoral examination. (a, b) The right maxillary. (c, d) The left maxillary. (e, f) Probe on tooth 16. (B) Radiological examination of Tooth 16. (a) Apical radiograph taken 7 months before the first visit. (b)The apical radiograph on the first visit in December 2020. Three-dimensional reconstruction. (c–f) CBCT on the first visit. (d) Coronal scan. (e) Sagittal scan. (f) Axial scan. (C) Radiological examination of Tooth 26. (a) Apical radiograph. (b–d) CBCT. (b) Coronal scan. (c) Sagittal scan. (d) Axial scan.

2 | MEDICAL HISTORY AND CLINICAL FINDINGS

A 52-year-old female patient came to see the dentist for cold irritation pain of the right maxillary first molar on December 4, 2020, which had been lasting 6 months. She denied food impaction pain, spontaneous pain, and nocturnal pain. The same cold irritation pain once occurred one and a half years ago and was relieved after taking metronidazole without treatment. Tooth 16 would feel pain when stimulated with cold water. There was attrition on the occlusal surface of Tooth 16 with some exposed dentin points and there weren't obvious caries and cracked lines on Tooth 16. There was slight pigmentation on the occlusal surface of Tooth 15. Tooth 17 had been restored with PFM, and porcelain fracture was observed at the palatal side of the occlusal surface (Figure 1A-a). There wasn't percussion pain or looseness in the right maxillary posterior teeth. Periodontal examination of Tooth 16: probing depth was 2–4 mm, while it increased to 8 mm when probing horizontally from the distobuccal cervical region (Figure 1A-e,f); No apparent loosening or bleeding on probing; The root bifurcation could not be probed. The patient had a history of orthodontic treatment 40 years earlier and 4 s premolars were extracted for orthodontics.

The apical radiograph showed low-density shadows in the distal cervical region of Tooth 16 and a blurred image of its distobuccal root (Figure 1B-b), which is like the image on the apical radiograph half a year ago (Figure 1B-a). A cone beam computed tomography (CBCT) examination presented the loss of the distobuccal root of the right maxillary first molar from coronal (Figure 1B-d), sagittal (Figure 1B-e), and axial (Figure 1B-f) scans, which showed that the distobuccal root of tooth 16 had been resorbed completely and slight resorption of surrounding alveolar bone. The alveolar fossa caused by root resorption has been filled with bone (Figure 1B).

3 | DIAGNOSIS AND TREATMENT

Two weeks after the first visit, the patient had symptoms of spontaneous pain. She was diagnosed with pulpitis of Tooth 16 according to her symptoms and radiological findings.

Root canal treatment was performed on Tooth 16 and distobuccal root canal orifices were filled with mineral trioxide aggregate (MTA) (Dentsply, USA). The specific process is as follows: reduce the occlusal stress first before root canal treatment by lowering the cusp slope of the distobuccal cusp of Tooth 16. Anesthetize Tooth 16 with 4% articaine with 1/100,000 epinephrine (Produits Dentaires Pierre Rolland, France) locally and infiltratively, isolated with a rubber dam (Coltène/Whaledent, Germany). The enamel and dentin on the top of the pulp chamber were abraded with a high-speed dental handpiece (Dentsply, USA) to expose the three root canal orifices: mesiobuccal, distobuccal, and palatal (Figure 2A-a,b). Remove pulp tissue in root canals. Unclog root canals with 10# K file (Dentsply, USA). Determine working length with an electronic apex locater (VDW, Germany) (palatal: 15.5 mm; mesiobuccal: 16 mm; distobuccal: 8.5 mm). Prepare the mesiobuccal root canal to X2 and the distobuccal and palatal to X3 with ProTaper Next instrument (Dentsply, USA) (Figure 2A-c,d). The root canals were flushed with EDTA (PULPDENT, USA) between instruments and rinsed with 1% sodium hypochlorite solution using a syringe with a 27-gauge notched needle (United Dental, China). The needle tip was inserted at a distance 2 mm short of the working length. The distobuccal root was filled with MTA after drying root canals with paper points (VDW, Germany) (Figure 2A-e). Calcium hydroxide paste (Ivoclar Vivadent, Switzerland) was injected into the other two root canals, and then sealed the pulp chamber with temporary restorative materials of zinc oxide coronally. After 2 weeks, the affected teeth were free of discomfort, and palatal and mesiobuccal root canals were filled with vertically condensed hot gutta-percha (VDW, Germany) and AH Plus (Dentsply, USA) sealer (Figure 2A-f,g). A periapical radiograph showed that gutta-percha was obturated to the proper site (Figure 2A-h). Two weeks later, temporary restorative materials (Cavit, 3 M, USA) were replaced by composite resin (3 M, USA). The whole root canal treatment process was completed under the microscope. Periodontal scaling was performed 2 weeks after root canal treatment and every 6 months after that.

4 | OUTCOME AND FOLLOW-UP

Six months after root canal treatment, CBCT showed no further expansion of the low-density shadow around the stump of the distobuccal root, at the same time, a bit of pus overflew when Tooth 16 was probed horizontally

FIGURE 2 Root canal treatment of Tooth 16 and examinations 6 months after the root canal treatment. (A) Root canal treatment. (a, b) Access cavity preparation and expose the three root canal orifices. (1) Mesiobuccal. (2) Distobuccal. (3) Palatal. (c, d) Root canal preparation. (e) MTA filling of the distobuccal root. (f, g) Root canal obturation of mesiobuccal and palatal roots. (h) A radiograph taken immediately after root canal obturation. (B) Clinical and radiologic examinations were performed 6 months after the root canal treatment. (a) Horizontal probe. (b) Occlusal situation: blue: lateral occlusion; rad: central occlusion. (c) Apical radiograph. (d–f) CBCT. (d) Coronal scan. (e) Sagittal scan. (f) Axial scan.

in the subsequent follow-up 6 months later (Figure 2B). Therefore, apical surgery was performed to remove the infected tissue from the root resorption site and to trim the distobuccal root 11 months after root canal filling treatment. Anesthetize tooth 16 locally by infiltration with 4% articaine with 1/100,000 epinephrine. Cut the gingiva along the gingival sulcus and raise the flap to expose the resorbed lesion (Figure 3A). Scale the abscess

FIGURE 3 Apical surgery of Tooth 16. (A) Reflect the flap and expose the lesion. (B) Remove inflamed tissue from the lesion and resect the root end. (C) Fill the loss site with MTA. (D) Suture back the flap.

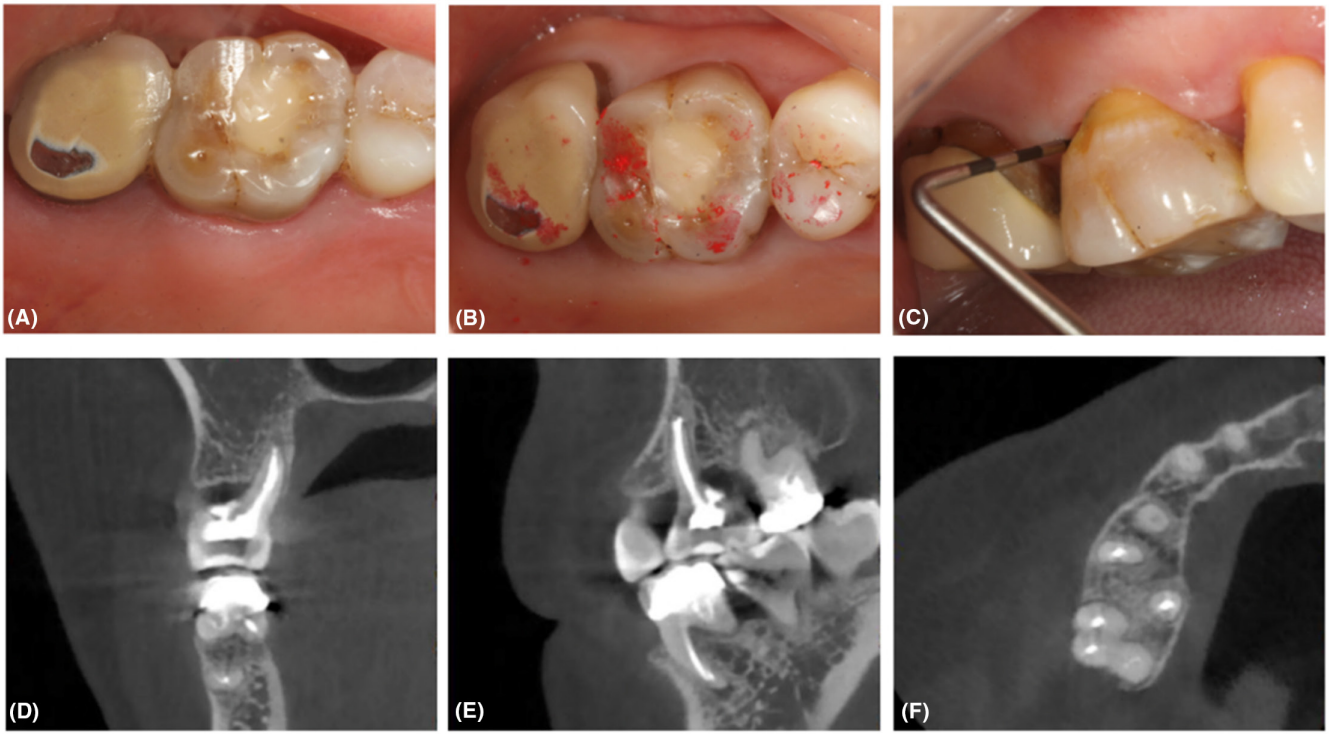

FIGURE 4 Intraoral and radiological examination of Tooth 16, 8 months after apical surgery in August 2022. (A) Occlusal surface. (B) Occlusal situation. (C) Horizontal probe. (D–F) CBCT. (D) Coronal scan. (E) Sagittal scan. (F) Axial scan.

and granulation soft tissue at root resorption. Gradually polish the absorption stump until the root is clean and tidy, and finally shape the root appropriately to facilitate postoperative periodontal tissue filling and self-cleaning (Figure 3B). Prepare the distobuccal root with microsurgical ultrasonic tip (Satelec, France) and MTA (Dentsply, USA) was used to retrograde fill the root-end with microcarrier system (Satelec, France) (Figure 3C). Then the gingival flap was reset and sutured (Figure 3D). The suture disappeared after 1 week. Apical radiographs and CBCT were taken 8 months after surgery (Figure 4).

5 | DISCUSSION

Idiopathic absorption often occurs without apparent cause, which is rare and usually involves multiple teeth.[3] In this case, the offending tooth has no medical history

of trauma, pulpitis, periapical periodontitis, or systemic diseases. The patient had been treated with orthodontics 40 years ago, which could be a potential predisposing factor.[4] In addition, no apparent caries or systemic disease was found so that it can be diagnosed as idiopathic absorption. Besides, idiopathic root resorption is rarely single and often multiple.[5] Therefore, we performed an imaging examination on the other side and didn't find suspicious manifestation of root resorption (Figure 1C).

The patient had been seen in the dental clinic a year and a half ago for cold irritation pain in Tooth 16, and the apical radiograph taken at that time already showed a faint hypodense shadow in the distal cervical area of this tooth (Figure 1B-a). As no CBCT was taken at that time, the doctor did not diagnose the presence of root resorption. And the patient was relieved with metronidazole. In this case, CBCT helps to identify the lesion and show the extent of the lesion more accurately.

This patient presented with only transient pain from cold stimulation at the initial visit instead of symptoms of pulpitis such as spontaneous pain. From the results of apical radiographs and CT scans, the distal buccal roots of 16 teeth have been absorbed to the point near the root bifurcation. The cementoenamel junction couldn't be probed, and the periodontal condition is relatively normal. So we considered using apical surgery on the distal buccal root to maximize the retention of the healthy dental pulp and made an appointment with the patient for apical surgery. Two weeks after the initial visit, the patient developed spontaneous pain, which is a typical symptom of pulpitis. We performed a relatively conservative root canal treatment on Tooth 16 with relatively less trauma than surgery.

However, at the 1-year postoperative review, there was pus flowing from the resorption site of the distobuccal root when probing, indicating that inflammation of the root resorption site was still present. To further eliminate the inflammation, we performed apical surgical treatment on Tooth 16 and completely removed the granulation tissue from the resorption site. One year after the apical surgery, the gingiva healed well with no inflammatory manifestations, and the gingiva receded after the swelling subsided. Imaging showed no further expansion of the shaded area, and the treatment was good with cortical bone margin formation on the surface of the alveolar bone around the resorption site. Non-surgical endodontic treatment, namely root canal therapy and root canal retreatment, is currently commonly used for treating pulp and periapical diseases. Endodontic surgery scrapes away the granulation tissue of the lesion under direct vision to remove the source of the disease and prevent the further development of resorption. At the same time, the apical foramen can be closed by inverse root canal preparation and root-end retrograde filling. During the treatment, we also applied microscopic and ultrasound treatment techniques for retrograde root-end preparation and filling to get better postoperative results. Considering the long-term functional stability of the affected tooth, we slightly reduced the cusp slope of the distobuccal cusp of Tooth 16 to reduce the occlusal stress before the root canal treatment. The patient had no obvious discomfort at our last follow-up in August 2022.

In conclusion, this case report provides a rare case of idiopathic root resorption and suggests the importance of CBCT in the diagnosis and treatment outcome evaluation of complex endodontic diseases. It also provides the basis for the selection of relevant treatment schemes. The entire process is not like a typical apical surgery, but rather a combination of apical surgery and periodontal rhizotomy, which may be called "variant apical surgery." In short, regardless of its name, these operations do achieve our goal of preventing root resorption, removing infections, and restoring periodontal health. However, there are still some shortcomings in this case, the gingival recession of Tooth 17 after apical surgery is obvious, which may be affected by flap trauma; the observation time is still short, and the long-term curative outcome still needs long-term follow-up.

AUTHOR CONTRIBUTIONS

Tianqi Li: Writing – original draft. **Xiangbo Meng:** Writing – review and editing. **Sunxin Zhou:** Resources. **Shuaichen Li:** Resources; visualization. **Qiang Luo:** Resources; visualization; writing – review and editing. **Tong Zhang:** Funding acquisition; supervision; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors deny any conflicts of interest related to this study.

DATA AVAILABILITY STATEMENT

All data supporting the findings are available within the manuscript.

CONTENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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REFERENCES

1. Fulton AJ, Liversidge HM. A radiographic study of estimating age by deciduous mandibular canine and molar root resorption. *Ann Anat*. 2016;203:33-37. doi:10.1016/j.aanat.2015.02.010
2. Patel S, Mavridou AM, Lambrechts P, Saberi N. External cervical resorption-part 1: histopathology, distribution and presentation. *Int Endod J*. 2018;51(11):1205-1223. doi:10.1111/iej.12942
3. Chu EY, Deeb JG, Foster BL, Hajishengallis E, Somerman MJ, Thumbigere-Math V. Multiple idiopathic cervical root resorption: a challenge for a transdisciplinary medical-dental team. *Front Dent Med*. 2021;2:652605. doi:10.3389/fdmed.2021.652605
4. Mavridou AM, Bergmans L, Barendregt D, Lambrechts P. Descriptive analysis of factors associated with external cervical resorption. *J Endod*. 2017;43(10):1602-1610. doi:10.1016/j.joen.2017.05.026
5. Abbott PV, Lin S. Tooth resorption-part 2: a clinical classification. *Dent Traumatol*. 2022;38(4):267-285. doi:10.1111/edt.12762

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