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# Surgical management of large-perforated class 4 invasive cervical root resorption: A case report

## KEYWORDS

Calcium-enriched mixture cement;  
Root resorption;  
Perforation repair

Invasive cervical root resorption (ICRR) is an aggressive but usually asymptomatic type of root resorption, defined as a resorptive process in the cervical area involving the root surface below the epithelial attachment. Based on location/size/extension, ICRR is classified into 4 classes; lesions with more invasion/extension, i.e. class 4, are given a poor prognostic measure.<sup>1</sup> Therefore almost all class 4 lesions are considered poor candidates for endodontic treatment and such teeth with perforations are usually recommended for extraction.

A class 4 ICRR was accidentally detected in tooth 35 during routine radiographic examinations of a 27-year-old female patient (Fig. 1A). The patient's medical history was noncontributory and there was no history of orthodontic treatment. There was no clinical sign/symptoms and sensibility pulp testing was positive. CBCT demonstrated a huge perforation on the buccal aspect which was not covered with the jaw bone (Fig. 1B–E). Based on clinical/radiographic examinations, the concluding pulp and periapical diagnosis were asymptomatic pulpitis, class 4 ICRR, and normal periapical area. Tooth extraction or a conservative surgical approach with a poor prognosis presented to the patient and she wanted to save the tooth.

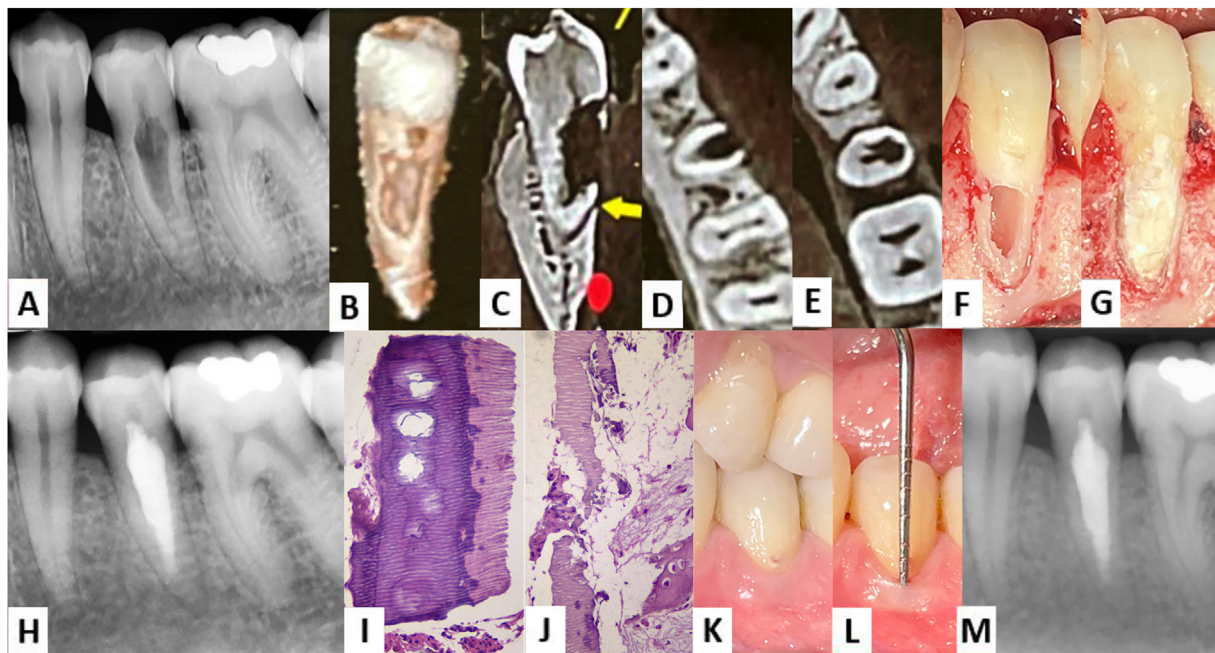
After antibacterial mouth rinse, local anesthesia, and full-thickness flap, accessible inflamed pulpal tissue was curetted and stored in formalin 10% for further histopathological examinations. Then using an ultrasonic retro-tip, the apical/coronal fragments of the root canal were prepared

(Fig. 1F). The powder and liquid of calcium-enriched mixture (CEM; BioniqueDent, Tehran, Iran) cement were mixed/inserted in the root canal space/resorptive defect (Fig. 1G). Before suturing, a periapical radiograph showed an optimum filling/sealing of the root canal walls (Fig. 1H). Histopathological evaluations of the removed tissues showed a chronic inflammatory cell infiltrate, resorptive dentine pieces with dentinal tubule structures, as well as resorptive lacuna with several large multinucleate odontoclast cells (Fig. 1I–J). At one-year recall, clinical examination revealed an asymptomatic/functional tooth with a normal periodontal probing depth on the midbuccal area (Fig. 1K–L), and radiographic examination showed an arrested resorptive process and normal periapical area (Fig. 1M).

Since the etiology of ICRR is not completely understood, there is no treatment protocol on how to prevent/treat such cases.<sup>2</sup> The common protocol is surgical exposure of the defect, complete debridement of resorptive tissue mechanically/chemically (using appropriate instruments and strong acids), and filling of the defect. Whilst this approach is successful in almost all class I–III cases, it fails in 87.5% of class 4 lesions as it is not possible to access the resorptive lesion in its entirety.<sup>1</sup> Therefore, clinicians tend to leave such teeth untreated for as long as they are asymptomatic or extract them. However, the current case was treated successfully via a simple mechanical debridement, since a large buccal window allowed to access the

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**Fig. 1** Clinical photographs, radiographs, and histopathological microphotographs of our case. (A) Preoperative periapical radiograph. (B–E) Cone-beam computed tomography showed that the invasive cervical root resorption (ICRR) lesion created a big perforation in the entire mid-root of tooth 35 and resorbed the covering buccal cortical plate as well. (F) The ICRR defect after mechanical debridement. Root canal space could be easily observed. (G) The defect cavity was repaired with calcium-enriched mixture (CEM) endodontic biomaterial. (H) Periapical radiograph after root canal filling and root perforation repair showed a three-dimensional filling/sealing of the defect. However, the radiograph clearly showed an unfilled portion of the pulp in the most coronal part of the root canal system. (I–J) Histopathological views of the removed tissue specimen with hematoxylin-eosin staining showed resorptive dentine pieces with dentinal tubule structures and resorptive lacuna with associated multinucleate odontoclast cells. (K) A clinical photograph at the 1-year recall showed no discoloration of the tooth crown and (L) a normal periodontal probing depth (= 2 mm). (M) One-year recall periapical radiograph showed an arrested resorptive process and normal periapical area of tooth 35.

entire lesion with the least invasiveness and then easily fill it with CEM cement as perforation repair biomaterial.<sup>3,4</sup> The most important finding of the current case was the re-establishment of the periodontium, i.e. attached gingiva, over the CEM biomaterial as the periodontal probing demonstrated a normal pocket depth. Previous research revealed that CEM cement as an alkaline/antimicrobial perforation repair material effectively seals the communications between periodontium and pulp space and promotes cementogenesis over itself.<sup>3,5</sup>

### Declaration of competing interest

The author has no conflicts of interest relevant to this paper.

### References

1. Heithersay GS. Treatment of invasive cervical resorption: an analysis of results using topical application of trichloroacetic acid, curettage, and restoration. *Quintessence Int* 1999;30: 96–110.
2. Bachesk AB, Queiroz AF, Bin LR, Bachesk AB, Pavan AJ. Clinical approach to external cervical resorption in the anterior teeth: a case report study. *Iran Endod J* 2021;16:118–22.

3. Asgary S. Management of an unrepairable root perforation due to inflammatory root resorption: a case report. *J Dent Sci* 2022; 17:1409–10.
4. Asgary S, Nosrat A. Conservative management of class 4 invasive cervical root resorption using calcium-enriched mixture cement. *J Endod* 2016;42:1291–4.
5. Asgary S, Fazlyab M. Surgical repair of invasive cervical root resorption with calcium-enriched mixture cement: a case report. *Gen Dent* 2015;63:37–40.

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