Surgical repair of external inflammatory root resorption with resin-modified glass ionomer cement

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External inflammatory root resorption after luxation injury is a frequent complication. This article describes a case of extensive external root resorption in the middle third of the root of a maxillary right incisor. Root canal treatment was performed followed by surgical intervention. The resorptive defect was debrided and part of the root was repaired with resin-modified glass ionomer cement. Postoperative follow-up revealed complete healing. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2011;111:e33-e36)

External inflammatory root resorption is a dental complication that can lead to tooth extraction. Traumatic injuries, orthodontic tooth movement, orthognathic and dentoalveolar surgery, periodontal treatment, and internal bleaching have been identified as potential predisposing factors. The mechanisms of root resorption require injury and stimulation.1,2 The injury is mechanical damage following dental trauma, surgical procedures, and excessive pressure of an impacted tooth or tumor. Damage to the cementum layer exposes the root surface to osteoclasts that can resorb dentin. With further stimulation by sulcular microorganisms in the adjacent,3 the resorption process is continuously in progress.

Clinically, external root resorption is often detected during routine radiographic examination. It could be associated with periodontal inflammation, then a local “pocket” may be detected.

In the case of surgical intervention to treat progressive external root resorption, glass-ionomer,4,5 light-cured resin composite,6,7 and mineral trioxide aggregate (MTA)8,9 have been recommended to restore the resorption defect.

Resin-modified glass ionomer cement (RMGIC) is an adhesive biocompatible restorative material used in dentistry. It has favorable physical properties similar to those of resin cements while retaining the basic features of the conventional glass ionomer cement.10

The following case report describes the use of an RMGIC restorative material to restore an extensive defect resulting from external root resorption.

CASE REPORT

A 22-year-old man was referred by his general dentist to the Department of Conservative Dentistry and Endodontics of Seoul, St. Mary’s Dental Hospital, for retreatment of teeth Numbers 8 and 9. The patient had sinus tracts and presented discoloration of teeth Numbers 8 and 9. He had a history of traumatic injury on the maxillary incisors 10 years previously.

The periapical x-ray revealed an irregular radiolucent area in the middle third of the root of tooth Number 9 (Fig. 1, A) and x-ray with gutta-percha tracing revealed sinus tracts originated from the external root resorption area (Fig. 1, B). On the middle buccal aspect, periodontal probing measured 10 mm (Fig. 1, C), whereas the mobility of the tooth was within normal limits.

First, retreatment was performed. The access cavity was opened and old filling materials were removed, but the root canal was calcified in the middle of the root (Fig. 2, A and B). Then, surgical repair of the resorption area was the treatment of choice.

A full-thickness flap was raised (sulcular incision, papillary-based incision). This revealed missing buccal bone plate and exposed a small amount of inflammatory granulation tissue (Fig. 3, A). Curettage of the granulation tissue was performed with removal of the superficial dentin layer using a round bur. The resorptive defect was located in the middle third of the root and involved the root canal (Fig. 3, B). After that, the root tip was resected, and retrograde preparation was performed using surgical ultrasonic tips (Satelec Acteon Cor, Mérignac, France) and P Max surgical micromotor with ultrasonic generator (Satelec Acteon Cor, Mérignac, France). The resorption area was repaired using RMGIC (Fuji II, GC Corporation, Tokyo, Japan) (Fig. 3, C). Retrograde filling was performed using white

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The tissue flap was then repositioned and sutured with nonabsorbable, sterile, nonmutagenic surgical sutures (Sofsilk 4-0, Covidien, Mansfield, MA). Antibiotics and nonsteroidal anti-inflammatory drugs were prescribed to prevent postoperative symptoms. The sutures were removed after 1 week. No postoperative complaints were noted and the patient was completely free of pain.

Nonvital bleaching with sodium perborate was performed. Teeth were lightened after 3 times of bleaching and resin cores were built up after 2 weeks (Fig. 4, B).

A follow-up examination 3 months after surgery revealed healing tendency of the lesion (Fig. 5, B). A maximum periodontal probing depth of 5 mm was observed on the buccal aspect. No increased tooth mobility was measured, and the patient was still pain-free.

At 12 months after surgery, radiographic examination revealed complete healing of the lesion (Fig. 5, C), the gingival attachment was still healthy, and tooth mobility was normal. The patient remained complaint-free. Further follow-up examinations were planned.

**DISCUSSION**

External root resorption may occur after injury of the precrementum, apical to the epithelial attachment, followed by bacterial stimulation originating from the
periodontal sulcus. At the first stage, the resorptive process does not penetrate the pulp space because of the protective layer of predentin, but with time, the process may penetrate into the root canal.\(^{11}\)

If the resorption lacuna is with a minute external entrance opening, it can be cleaned out and obturated from the root canal,\(^{12,13}\) but if it is not possible, surgical intervention will be needed after root canal treatment.

There are many materials to repair the external root resorptive defect. MTA is a popular material because of its tight sealing ability; however, RMGIC was chosen in this case because it has biocompatible properties and it has similar tooth color material.

One of the disadvantages of MTA is related to its color. Discoloration of marginal gingiva after perforation repair with gray MTA has been reported.\(^{14}\) Recently white MTA was introduced, but there was still potential of gingival discoloration in perforations located close to the marginal area.

Three clinical investigations in primary teeth disclosed discoloration of teeth after using white MTA as pulpotomy material.\(^{15-17}\) One in vitro study has reported that all white MTA samples show discoloration 3 days after placing the material into a mold that was in contact with phosphate-buffered saline (PBS).\(^{18}\) In this case, we worried about gingival discoloration from MTA because the position of the tooth was central and resorption area was midbuccal. Therefore, we used RMGIC instead of MTA and no gingival discoloration was observed after 12 months.

The treatment of this case involved the removal of the granulation tissue followed by the repair of the perforation site. The patient returned after 12 months with no signs or symptoms. The tooth was in function with no discomfort or pain during that time. The gingiva appeared healthy with normal color and texture. There was no mobility or bleeding on probing; however, there was still 5-mm probing depth in midbuccal gingival area. Finally, treatment of the resorptive defect with RMGIC was considered successful as evidenced by clinical and radiographic findings after 12 months.

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