Journal of Dental Sciences (2016) 11, 338–342

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CASE REPORT

Repair of a perforating internal resorption: two case reports

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Received 1 February 2011; Final revision received 12 April 2011
Available online 2 May 2013

KEYWORDS
$Ca(OH)_2$;
internal root resorption;
microscope;
mineral trioxide aggregate (MTA);
radiography

Abstract Internal resorption is a rare condition in permanent teeth, and may result from trauma, caries, or restorative procedures. Internal resorption is usually asymptomatic and is first identified as a round-shaped enlargement of a root-canal space on routine radiographs. Large resorption defects may result in penetration of the tooth into the periodontium through the cementum. The gold-standard treatment consists of debridement and obturation of the pulp space, sealing of the external communication, and restoration of the normal function of the tooth through a nonsurgical or surgical method. In this case presentation, we report on two methods for repair of internal resorption with perforation. The first method consisted of treating the lower right second premolar by conventional endodontic therapy under a microscope, followed by repair with mineral trioxide aggregate. The second method consisted of surgical treatment of the upper right central incisor. The choice of treatment depends on the size of the perforation, its location, and the ability to approach it for repair.

Introduction

Internal resorption is an unusual condition in permanent teeth. The exact causes of the damage it produces are still unknown. However, it has been proposed that trauma, pulpitis, pulpotomy, a cracked tooth, tooth transplantation, restorative procedures, invagination, orthodontic treatment, and even herpes zoster viral infection are all likely predisposing factors.[1]

The pulpal side of the dentin is lined by odontoblasts and predentin. Odontoblasts have no resorptive ability and, in combination with the unmineralized predentin, appear to form a barrier against dentin resorption. Internal resorption is preceded by chronic pulpal inflammation, loss of or

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http://dx.doi.org/10.1016/j.jds.2013.02.030

damage to odontoblasts and the predentin, and invasion of the pulp by macrophage-like resorbing cells.[2,3]

Full expansion of the resorption area requires that the pulp is vital. By contrast, partially or completely necrotic coronal pulp areas allow the entrance of microbial antigens via the root canal, thereby favoring continuous bacterial infection.[1]

Most teeth with internal root resorption are symptom free and are first clinically recognized through routine radiographs. However, when resorption actively progresses, the tooth is only partially vital and may present typical symptoms of pulpitis. If perforation occurs, the infection may prove difficult to control. Teeth with a perforation also have a weaker structure as a result of loss of hard tissue. Although most patients complain of only mild or no pain, perforation is often accompanied by sinus tract formation and swelling.[1]

The original canal shape is lost at the site of resorption. Therefore, internal resorption is readily identified as a radiolucent, round, symmetrical widening of the root-canal space. Not all cases of internal root resorption progress in a similar fashion, thus, oval and asymmetrical shapes may also be found. Internal resorption is frequently observed in the cervical region but may occur throughout the entire root-canal system. Teeth with coronal resorption may show a pinkish hue due to resorption of the coronal dentin and enamel by prolific capillaries in the pulpal inflammatory tissue.[1,2]

Here, we report two cases of perforating internal resorption in which the diagnosis justified the application of two different treatment methodologies.

Case reports

Case 1

A 12-year-old girl was referred to the Endodontic Department of the Taipei Medical University Dental Clinic because of a resorptive lesion in her lower right second premolar. The lesion was identified on a periapical radiograph, which was taken by the referring dentist for observation of a sinus tract in the buccal area. The tooth had been treated at a local dental clinic 2 weeks prior to this examination.

Clinical examination revealed that tooth number 45 was slightly tender to percussion but showed no abnormal sensitivity to palpation or biting. No sinus tract was found in this quadrant. The periodontal condition was normal, with no gingivitis or pocket depths exceeding 3 mm. Her medical history was noncontributory. A radiographic examination revealed an irregular radiolucency in the coronal one-third to two-thirds of the root next to a crescent-shaped radiolucent lesion in the alveolar bone (Fig. 1). Based on the radiographic findings and history, a lesion was diagnosed as perforating internal resorption; the patient had previously been diagnosed with asymptomatic apical periodontitis and therapy had been initiated.

At the first appointment, we removed the temporary sealing under the rubber dam and observed bleeding from the canal. The size of the perforation was unknown, therefore, we used normal saline for irrigation but failed to negotiate the canal. $Ca(OH)_2$ was administered as an intracanal medicament, and the canal was temporarily restored with intermediate restorative material (IRM, Dentsply International/L.D. Caulk Division, Dentsply International Inc., Milford, DE, USA).

Figure 1 An irregular radiolucency in the coronal third to middle third of the root next to a crescent-shaped radiolucent lesion in the alveolar bone.

The bleeding was controlled, and the canal was negotiated. The perforated site was located under the microscope on the second visit. The working length was determined electronically using an Elements Apex Locator (SybronEndo, Anaheim, CA, USA) and confirmed by radiography (Fig. 2). The canal was cleaned, shaped, and irrigated with 2.5% NaOCl and endosonic instrument (Suprasson P5, Satelec, France). $Ca(OH)_2$ was again administered as an intracanal medicament. Two weeks later, at the third appointment, the canal was irrigated with 2.5% NaOCl and endosonic, and the $Ca(OH)_2$ was replaced in the canal. On the fourth visit, the canal from the apex to the perforation site was obturated using the lateral compaction method with gutta percha and sealer (Sealapex; SybronEndo). The perforation site and the canal above it were sealed with mineral trioxide aggregate[4] (MTA, ProRoot; Dentsply/Tulsa

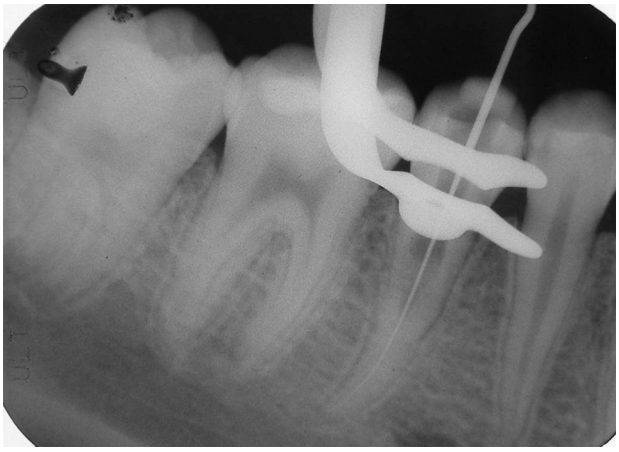

Figure 2 The canal was negotiated and the perforation site was located under a microscope. The working length was 22 mm, initial apical file (IAF) number 10.