Management of a Previously Treated, Calcified, and Dilacerated Maxillary Lateral Incisor: A Combined Nonsurgical/Surgical Approach Assisted by Cone-beam Computed Tomography

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Abstract

Teeth with calcified canals, dilacerated roots, and associated large periradicular lesions involving both cortical plates pose a challenge to dentists. In addition to the nonsurgical endodontic treatment, such teeth may require surgical intervention with concomitant use of bone grafting materials and barrier techniques. These techniques, when combined with the use of a host modulating agent such as platelet-rich fibrin (PRF), may improve the chances of success. A 26-year-old woman was referred for dental treatment with a recurrence of an intraoral sinus tract 2 months after periradicular surgery in the upper anterior region. Clinical and radiographic examinations revealed a calcified and perforated maxillary left lateral incisor with a severely dilacerated root as well as an associated large radiolucent lesion surrounding the roots of the maxillary left central and lateral incisors. A cone-beam computed tomographic scan of the anterior maxilla showed erosion of the labial and palatal cortical plates in the same region. A calcified canal in the lateral incisor was negotiated up to the straight line portion of the canal. Periradicular surgery with root-end resection was performed, and root-end filling was performed with mineral trioxide aggregate. The perforation present on the middle third of the labial surface of the root was repaired with mineral trioxide aggregate, and the canal was cleaned, shaped, and obturated. A PRF scaffold was prepared and used with a collagen membrane and a freeze-dried bone allograft. Follow-up visits after 3 months, 6 months, and 1 year revealed satisfactory clinical and radiographic healing. The combined use of nonsurgical and surgical modes of treatment cannot be overemphasized in this case. The use of PRF along with a bone graft and a barrier membrane may have enhanced the speed of healing and the resolution of periradicular radiolucency by enhancing bone regeneration. *(J Endod 2016;42:984–988)*

Key Words

Apicomarginal defect, collagen membrane, dilaceration, perforation, platelet-rich fibrin, pulp canal obliteration

Traumatic dental injuries involve both the teeth and the periradicular tissues, making their management multidisciplinary and multifactorial. Traumatic dental injuries can lead to complications such as pulp necrosis, pulp canal obliteration/calcification, and root resorption (1, 2). Pulp canal obliteration presents itself as an uncontrolled hard tissue deposition along the pulp chamber and root canal walls, eventually leading to partial or complete obliteration of the root canal space (3, 4). A pretreatment radiograph reveals calcification of the pulp chamber and radicular canal spaces, but, unfortunately, these spaces have adequate room to allow the passage of millions of microorganisms that can lead to the development of periradicular pathology (5).

Another factor that has the potential to complicate endodontic treatment is dilaceration. Failure to recognize the multiplanar curvatures of the dilacerated teeth is one of the factors contributing to the higher incidence of failure of endodontic treatment in these teeth. This is more commonly observed in single-rooted teeth, such as maxillary lateral incisors, than in multirooted teeth. A few possible etiologic factors responsible for dilaceration are a mechanical trauma to the primary predecessor tooth, an idiopathic developmental disturbance, advanced root canal infections, an ectopic development of the tooth germ, and lack of space (6).

When such dilacerated teeth also present with pulp canal calcification, the complexity of treatment increases the likelihood of further operative complications such as root perforations. The presence of additional complications, such as a sinus tract formation and a large periradicular radiolucency, in relation to these teeth may necessitate combined nonsurgical and surgical management.

The amount and location of bone adjacent to the root structures affect the prognosis of periradicular surgery. An apicomarginal defect has an adverse effect on the outcome, reducing the rate of complete healing to 27% to 37% (7, 8). The reduction in the rate of healing occurs because the healing takes place by repair rather than regeneration. The use of guided tissue and bone regeneration techniques and host modulating agents, such

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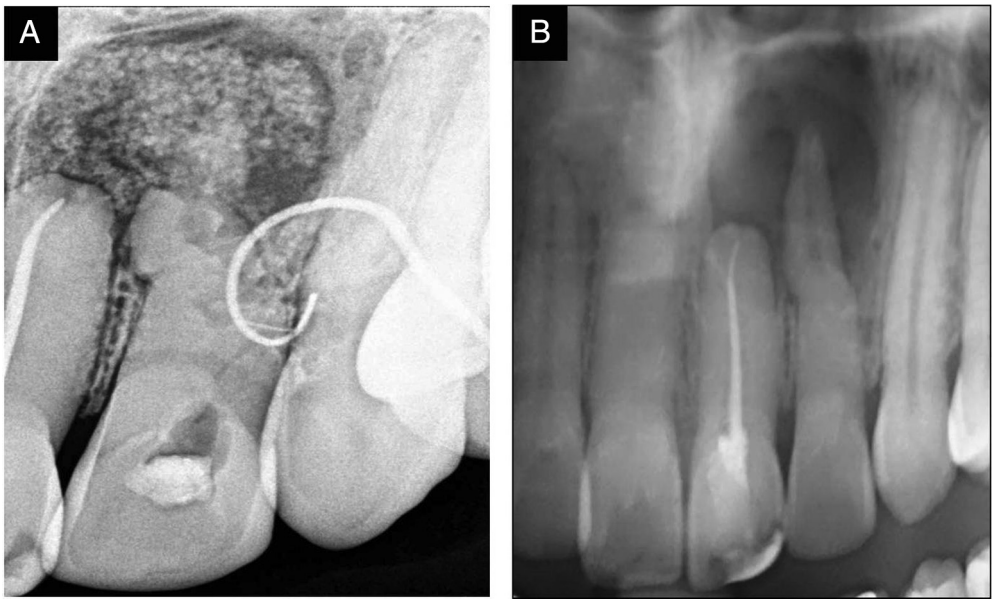

Figure 1. Preoperative diagnostic investigations. (*A*) The preoperative RVG shows a sinus tract tracing with gutta-percha pointing at tooth #10. (*B*) The preoperative orthopantomogram showing a calcified canal and dilacerated root in tooth #10 and faulty obturation in tooth #9. Note the periradicular radiolucency around teeth #9 and #10.

as platelet-rich fibrin (PRF), have been advocated for such cases of reduction in the rate of healing.

Materials and Methods

A 26-year-old woman was referred to the Department of Conservative Dentistry, ESIC Dental College, Rohini, New Delhi, India, with a recurrence of an intraoral sinus tract 2 months after periradicular surgery in the upper anterior region. Past history revealed trauma to the maxillary left anterior teeth at the age of 14 years, which led to the chipping (Ellis class II fracture) of her left central incisor (tooth #9) and no apparent injury to the lateral incisor (tooth #10). Clinical examination revealed the presence of an intraoral suppurative sinus tract in the labial gingiva between teeth #10 and #11 (maxillary left canine). Sinus tract tracing with a size #25 gutta-percha cone and a subsequent radiovisiogram (RVG) showed the gutta-percha cone pointing toward tooth #10 (Fig. 1*A*). The pulp canal space in tooth #10 was calcified, and the root was severely dilacerated in the mesial direction (Fig. 1*A* and *B*). A faint radiolucent line extending from the attempted access cavity preparation to the middle third of the labial surface of the root of tooth #10 suggested the presence of lateral root perforation, which was confirmed by placing a no. 8 K-file through the perforation and obtaining another RVG.

There was a large periradicular radiolucency surrounding the roots of teeth #9 and #10 with radiopacity in the center that was suggestive of a bone graft placed in a previous surgery (Figs. 1 and 2). The quality of obturation in tooth #9 seemed questionable (Fig. 1*B*). There was apical blunting and irregular resorption of the roots in both teeth #9 and #10. A cone-beam computed tomographic (CBCT) scan performed with a Carestream 9300 scanner (Carestream, Rochester, NY) at a resolution of 0.09 × 0.09 × 0.09 mm revealed a large periradicular radiolucency (15.19 mm × 9.35 mm) extending from the intermaxillary midline region to the mesial periradicular area of tooth #11 (Fig. 3*A*). There was erosion of the adjoining labial and palatal cortical plates in the region of teeth #9 and #10. A sagittal view of tooth #10 showed partial resorption of the root in the apical third with the residual labial third of the root *in situ* (Fig. 2).

Written informed consent was obtained from the patient for the treatment and for the use of CBCT imaging to assess healing. The treatment was planned as a combined nonsurgical instrumentation and obturation (in tooth #10) to be performed during the surgical intervention at the same appointment. Nonsurgical endodontic retreatment was performed on tooth #9. Access preparation was modified on tooth #10, and the actual canal was located and negotiated using no. 6, 8, and 10 K-files (C+ files; Dentsply Maillefer, Johnson City, TN) with a gentle watch-winding motion with minimal vertical pressure and with 5.25% sodium hypochlorite (Novo Dental Products Pvt Ltd, Mumbai, Maharashtra, India) as a root canal irrigant. EDTA-Urea preparation (RC-Prep; Premier Dental Products, Norristown, PA) was used to assist in root canal lubrication and instrumentation; however, negotiation was possible only up to the straight line portion of the canal. The rubber dam clamp was removed to assess the orientation of the access cavity relative to the position of the pulp canal space. At the next appointment, a full mucoperiosteal flap was reflected labially

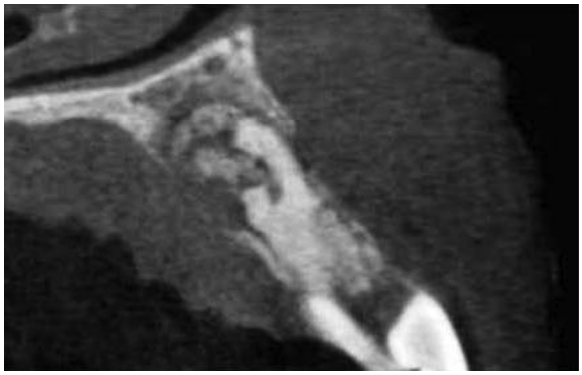

Figure 2. The sagittal CBCT view shows partial resorption of the root in the apical third with the residual labial third of the root in tooth #10. Note the through-and-through bony lesion and the radiopacity in the center of the periradicular radiolucency that was suggestive of a bone graft placed in the previous surgery.