Saving Single-rooted Teeth with Combined Endodontic-periodontal Lesions

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Abstract

Introduction: Teeth affected by combined endodontic-periodontal lesions are usually considered by all prognosis classifications as hopeless teeth. The development of new biomaterials combined with modern endodontic and periodontal regeneration techniques may improve dental prognosis and maintain the affected teeth. Moreover, 1 of the replacement options for those teeth, dental implants, has shown an increasing number of biological and technical complications. **Methods:** Five patients were included in this case series study. Full periodontal and radiographic examination revealed generalized chronic periodontitis. Moreover, endodontic-periodontal lesions affecting single-rooted teeth were detected in those patients with tissue destruction beyond the apex. After splinting those teeth, conventional endodontic and nonsurgical periodontal treatment was performed. Three months later, periodontal regeneration was applied at those teeth in order to reconstruct supporting tissues and to improve dental prognosis. **Results:** After a follow-up period ranging from 14 months to 17 years, it was observed that all teeth remain asymptomatic and in normal function. No signs of apical pathosis were observed, and the periodontium was stable. All patients were included in a strict maintenance program to check the periodontal and apical status. **Conclusions:** This case series shows that it is possible to change the prognosis of teeth affected by combined endodontic-periodontal lesions, even if the periodontal support is destroyed beyond the apex. *(J Endod 2016;■:1–6)*

Key Words

Endodontic-periodontal lesion, endodontic therapy, hopeless prognosis, periodontal regeneration

Significance

Teeth affected by true combined endodontic-periodontal lesions are usually considered by all prognosis classifications as hopeless teeth. The development of new biomaterials combined with modern endodontic and periodontal regeneration techniques may improve dental prognosis and maintain the affected teeth.

Every day clinicians have the dilemma of whether to maintain or extract a tooth with a poor prognosis and replace it with a dental implant or another kind of prosthesis. Different classifications dealing with tooth prognosis have been developed in an attempt to facilitate the decision, taking into consideration periodontal factors (1, 2). A questionable dental prognosis means that a tooth could be maintained with advanced treatment, whereas a hopeless prognosis usually indicates that the tooth should be extracted because of the incapability of improving the prognosis and controlling the disease (3).

A lesion involving pulpal and periodontal tissues that at the same time communicates both compartments usually implies a great destruction of the tooth-supporting tissues; therefore, many authors classify those teeth as hopeless and recommend their extraction. Dental implants have been considered the treatment of choice to replace a tooth in the last decades because of their good survival and success rates. However, many recent studies have shown high complication rates caused by, in most cases, peri-implant diseases (4–6). The development of new materials and techniques in the field of endodontics and periodontics has improved endodontic-periodontal lesions. Enamel matrix derivative (EMD) or guided tissue regeneration techniques have the potential to regenerate periodontal attachment in humans. EMD is composed of a number of proteins (90% amelogenins) to induce the formation of new cement, periodontal ligament, and bone (7). However, guided tissue regeneration techniques are based on the concept of selective exclusion of epithelial cells from colonizing the wound and space maintaining for the blood clot to regenerate periodontal tissues (8).

Cortellini et al (9) compared the extraction and replacement of hopeless teeth with implants versus regeneration of periodontal tissues and no extraction. Twenty-three of 25 teeth were maintained 5 years after surgical treatment.

The aim of this case series was to assess the long-term outcomes of endodontic and regenerative periodontal treatment of teeth with hopeless prognoses affected by combined endodontic-periodontal lesions beyond the apex.

Case Series

Five patients were included in this study. The patients were treated in the periodontal unit of the University of Santiago de Compostela, Santiago de Compostela, Spain,

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between 1999 and 2015. They required periodontal treatment because of the presence of generalized swelling, bleeding, and tooth mobility.

Based on a baseline periodontal examination (clinical and radiographic assessment), patients were diagnosed as having generalized severe chronic periodontitis. The patients were systemically healthy, and their medical history was not contributory to their dental problems. It was also observed that the teeth involved were affected by endodontic-periodontal lesions, probably as an extension to the pulpal tissues of a primary periodontal lesion (Fig. 1–5) (10). In those teeth, probing depths were extended to the root apex, and tooth mobility was type II or III (Table 1). Pulp vitality tests were negative (all teeth did not respond to thermal and electric pulp testing [vitality scanner; SybronEndo, Glendora, CA]), and no trauma from occlusion was observed. A radiographic examination showed extensive vertical bone defects that involved the apex (Fig. 1*B*). Tooth prognosis was evaluated at baseline and re-evaluated at the end of the follow-up, applying the classification proposed by Kwok and Caton in 2007 (3).

Endodontic Treatment

Hypermobile teeth were splinted to the neighboring teeth, and immediately supragingival periodontal debridement was performed (Fig. 3*A*). A few days later, root canal treatment was approached as follows. Local anesthesia with 2% lidocaine containing 1:100,000 epinephrine was given as local infiltration for all cases. The endodontically involved tooth was then isolated with a rubber dam. The patency for the root canal treatment or retreatment was performed using #10 to #20 hand files (Dentsply Maillefer, Ballaigues, Switzerland) or Hëdstrom #10 to #20 hand files for retreatment. The working length was established with a Root ZX apex locator (J Morita Manufacturing, Kyoto, Japan). All cases were instrumented with ProTaper Universal (Dentsply Maillefer) files (up to F2, F3, or F4 depending on the case). Before final closure of the canal, all cases were irrigated with 5.25% sodium hypochlorite and 17% EDTA liquid; both were activated with manual dynamic irrigation. The canals were then dried with sterile paper points and immediately filled with gutta-percha (Autofit; Analytic, Glendora, CA) and AH Plus sealer (Dentsply, Konstanz, Germany) using the continuous wave compaction technique with the tip of the heat carrier reaching 4 mm from the working length and backfill with a warm gutta-percha gun (Obtura II; Obtura Spartan, Fenton, MO) for the middle and coronal thirds. The access cavity was then restored in the same visit with composite (Ceram X mono; Dentsply DeTrey, Konstanz, Germany) placed with an incremental technique. After that, the occlusion was checked and adjusted if necessary.

Periodontal Treatment

In the first phase, nonsurgical periodontal treatment was performed in 2 sessions of 1 hour to control the generalized infection. Subgingival instrumentation was performed with ultrasonic devices (EMS, Nyon, Switzerland) and minicurettes (Hu-Friedy, Chicago, IL) to eliminate calculus, and a rubber brush was used to polish dental surfaces, all accompanied with oral hygiene instructions at the end of each session for adequate plaque control. Carious lesions were treated simultaneously in this phase if necessary. Under local anesthesia, the caries was removed and the cavity prepared. Finally, direct composite restoration was performed (Ceram·X Duo, Dentsply).

Two months later, re-evaluation was performed, and periodontal surgery was planned in those sextants where necessary, except for the teeth affected with the endodontic-periodontal lesion. After the periodontal infection was controlled, and at least 3 months after endodontic treatment, those teeth were treated with the goal of periodontal regeneration (9).

Flap design was performed according to the minimal invasive surgical techniques described by Cortellini et al (11–14). Once the mucoperiosteal flap was reflected and the apex of the teeth exposed, the defects were debrided to remove the granulomatous tissue, and the roots were scaled and planed with the aid of an ultrasonic device

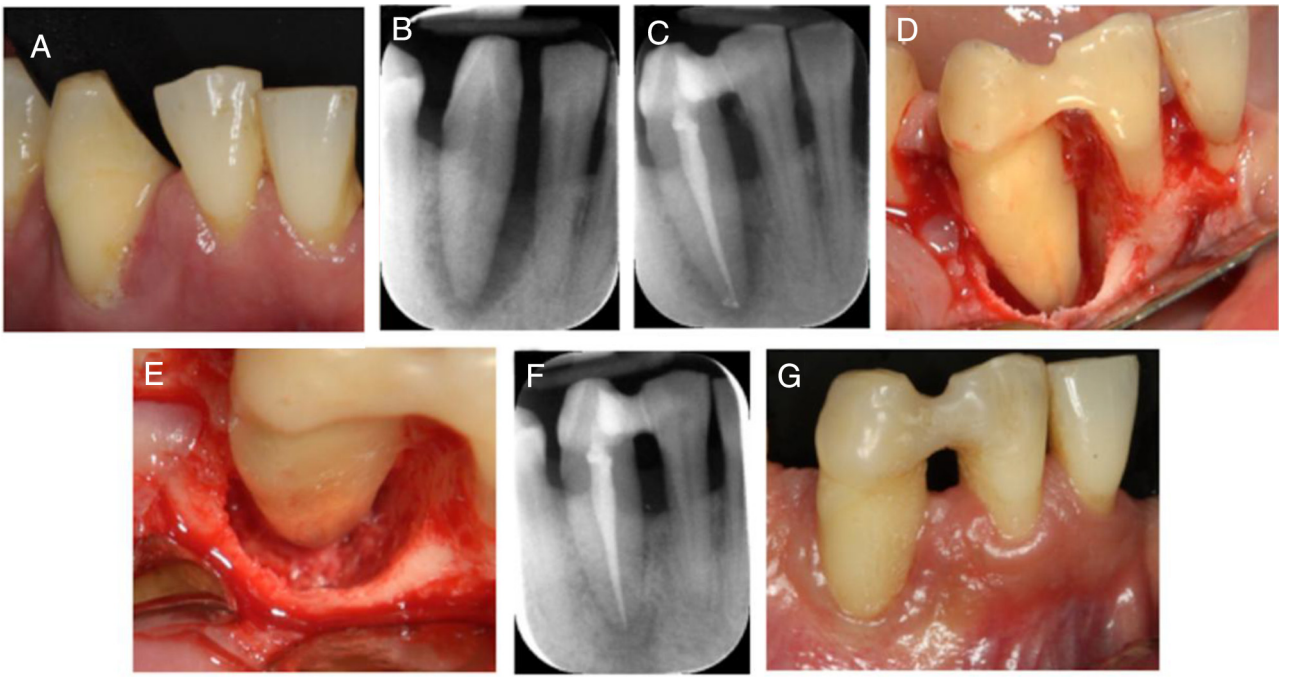

Figure 1. Case 1. (*A*) The buccal view of the tooth with 5-mm gingival recession, bleeding, and inflammation. (*B*) The baseline radiograph showing bone destruction beyond the apex of tooth #27. (*C*) The postendodontic radiograph showing a reduction of the bone defect. (*D*) The granulation tissue was removed and the root shaped. (*E*) Three-wall bone defect. (*F*) The 14-month follow-up radiograph showing resolution of the bone defect. (*G*) The presence of healthy soft tissues.