Combined Endodontic Therapy and Intentional Replantation for the Treatment of Palatogingival Groove

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Abstract

A palatogingival groove is an anatomic malformation that predisposes the involved tooth to a severe periodontal defect. When the condition is complicated by pulpal necrosis, affected teeth often present a dilemma in terms of diagnosis and treatment planning. In this report, we describe the case of a patient with a maxillary lateral incisor with a deep palatogingival groove extending to the root apex and severe periodontal destruction (local pocketing). Suggested treatment modalities included curettage of the affected tissues, elimination of the groove by grinding and/or sealing with a variety of filling materials, and surgical procedures. In this case, a combined treatment approach, involving both endodontic therapy and intentional replantation after restoration with a self-etching flowable composite, resulted in periodontal healing and significant healing of the periradicular radiolucency at 12 months. In short, intentional replantation offers a predictable procedure and should be considered a viable treatment modality for the management of palatogingival grooves, especially for single-rooted teeth. *(J Endod 2016;42:324–328)*

Key Words

Developmental anomalies, intentional replantation, maxillary lateral incisor, palatogingival groove

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Palatogingival or palatal groove is defined as an anatomic malformation of developmental origin usually found on the lingual aspect of the roots of maxillary incisor teeth (1). Such grooves usually start near the cingulum of the incisor and run apically down the cementoenamel junction, terminating at various depths along the root (2). Many other terms have been used to describe this anomaly, including palatal groove (3, 4), developmental radicular anomaly (5), distolingual groove (6), radicular lingual groove (7, 8), palatoradicular groove (9, 10), radicular groove (11), and cinguloradicular groove (12).

The etiology of the palatogingival groove remains unclear. Some authors have proposed that the defect is a mild form of dens invaginatus and results from infolding of the enamel organ and Hertwig epithelial root sheath before the calcification phase (2, 6), whereas others have postulated that it is the result of a failed attempt by a tooth to form an additional root (5, 13). However, Ennes and Lara (14) suggested that an alteration of genetic mechanisms may be responsible for the occurrence of the groove. The incidence of a palatogingival groove is reportedly between 2.8% and 18% (6, 9, 10, 15). The broad range of percentages reported may be caused by variations in study design, the ethnicity of participants, region, sample size, and/or diagnostic criteria.

Given the cervical location of this anomaly, a palatogingival groove may provide a pathway by which bacteria can penetrate the periodontal ligament (PDL) area, leading to the accumulation of bacterial plaque and contributing to localized periodontitis (2). Once a breach in the periodontal attachment involving the groove occurs, a self-sustaining localized periodontal pocket can develop along the length of the groove (5). Furthermore, there may be communication between the pulp canal system and the periodontium through the pulp cavity and/or accessory canals; thus, these grooves may also lead to combined endodontic-periodontal lesions (16, 17).

Palatogingival grooves on maxillary incisors often present a dilemma in terms of diagnosis and treatment planning. Multiple case reports have described treatment modalities ranging from the resection of an accessory root to periodontal regeneration with various materials depending on the extent of the osseous defect (18–23). In this case report, we present the case of a patient with an anatomically complicated lateral incisor with, according to Gu's classification (24), a type II palatogingival groove. A combined treatment approach, involving both endodontic therapy and intentional replantation after restoration with a self-etching flowable composite, resulted in almost complete healing of the periradicular radiolucency at 12 months.

Case Report

A 50-year-old woman was referred for root canal treatment of the maxillary right lateral incisor (tooth #7) (Fig. 1*A*). The patient's chief complaint was of a purulent discharge from tooth #7 over the preceding 4 months. A clinical examination revealed that tooth #7 had resin composite in the access opening without caries or fracture. As expected, vitality testing (electric and thermal) yielded negative results, whereas percussion testing yielded positive results. Testing of the adjacent and contralateral teeth elicited normal responses. A draining sinus tract was evident on the adjacent labial alveolar mucosa. The patient was unaware of any previous trauma to the maxillary anterior region. Investigation of the patient's medical history failed to identify any relevant conditions. Tooth mobility was within physiologic limits. A more detailed clinical examination revealed a groove emerging from the cingulum that continued distoapically

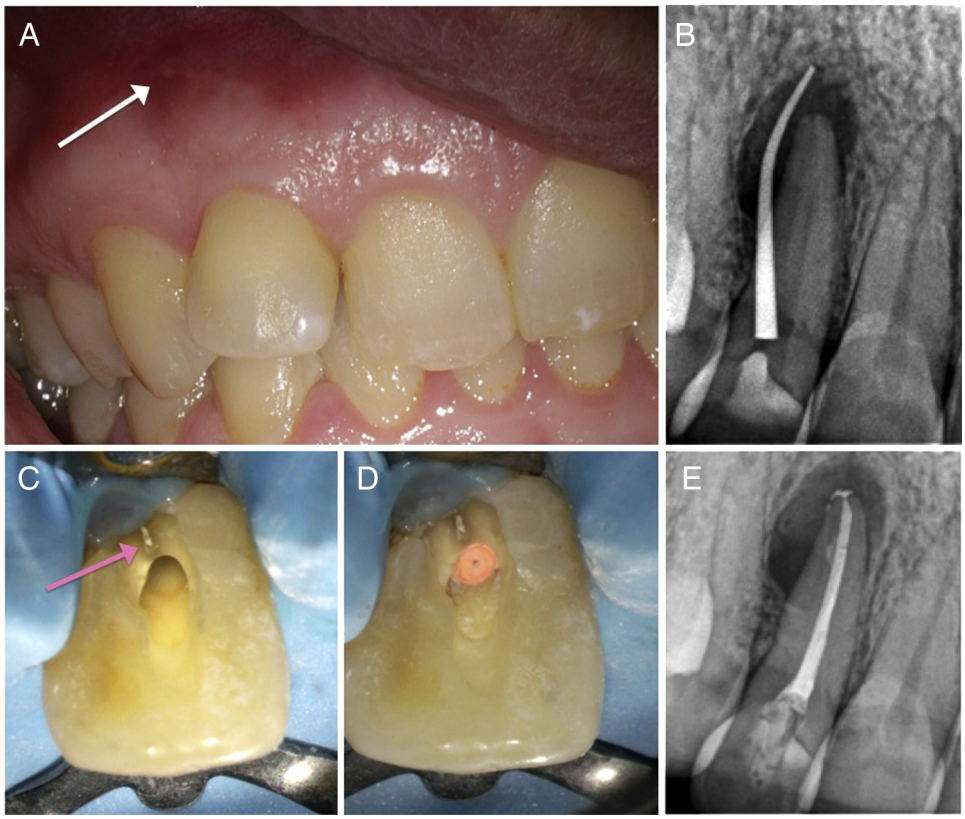

Figure 1. (*A*) The maxillary right lateral incisor (tooth #7). A preoperative clinical photograph showing a draining sinus tract (*white arrow*). (*B*) A periapical radiograph with a gutta-percha cone tracing the facial sinus tract to the periradicular radiolucency associated with tooth #7. Two narrow vertically oriented radiolucent lines were also evident within tooth #7. (*C*) Communication of the radicular groove (*pink arrow*) with the pulp chamber. (*D*) An image of the obturated root canal. (*E*) A postoperative radiograph.

down the palatal aspect of the root. Periodontal probing around the maxillary incisors revealed local pocketing almost to the apex on the distopalatal region of tooth #7. Facially, the gingival sulcus had a normal probing depth. Oral hygiene was poor, and calculus surrounded the tooth.

Radiographic examination revealed an extensive periradicular radiolucency involving the apical two thirds of the root of tooth #7. The sinus tract was traceable, with a gutta-percha cone to the distal area (Fig. 1*B*). In addition, 2 narrow, vertically oriented radiolucent lines were evident on the radiographs. We diagnosed a combined endodontic-periodontal lesion with periodontal breakdown associated with a palatogingival groove and concomitant pulpal necrosis. During this appointment, an interdisciplinary treatment plan was formulated; the patient was informed that tooth #7 had a questionable long-term prognosis because of the length of the radicular groove and the ability to treat the defect periodontally.

Three weeks later, after prophylaxis and removal of the localized calculus, the resin composite in the access opening was removed under rubber dam isolation (Hygenic Dental Dam; Colténe Whaledent, Langenau, Germany). When the pulp chamber was reached, the root canal orifice and palatogingival groove were visible. Figure 1*C* shows the communication between the radicular groove and the pulp chamber. The root canal was shaped using a size 10 and 15 K-files (Dentsply Maillefer, Ballaigues, Switzerland) to obtain a manual glide path. Instrumentation was completed using Mtwo nickel-titanium rotary instruments (VDW GmbH, Munich, Germany) with an X-Smart endodontic motor (Dentsply Maillefer). The instrumentation sequence was size 10, 0.04; 15, 0.05; 20, 0.06; 25, 0.06; 30, 0.05; and 35, 0.04. Copious irrigation with 4.2% sodium hypochlorite (NaOCl) in a plastic syringe with a closed-end needle (Hawe Max-i-Probe; Kerr-Hawe, Bioggio, Switzerland) was performed at each step of instrumentation. After root canal preparation, a final irrigation was performed, which alternated between 17% EDTA and 4.2% NaOCl solution. The last NaOCl irrigation was activated with a size 20 K-file (Satelec Acteon Group, Merignac Cedex, France) under passive ultrasonic activation for 1 minute. The root canal was obturated with warm vertical condensation using System B (SybronEndo Corp, Orange, CA) for down pack and Obtura II (SybronEndo Corp.) for backfilling (Fig. 1*D* and *E*). The access cavity was etched, primed, and filled with light-cured resin composite (Filtek Supreme XTE; 3M ESPE, Seefeld, Germany).

At an evaluation appointment 2 months later, the pocket depth associated with the palatogingival groove had not decreased, and it bled on probing as expected. The patient was asymptomatic but, because the facial sinus tract persisted, she was scheduled for an intentional replantation. The patient was prescribed antibiotics (amoxicillin plus clavulanic acid 1 g daily) starting the day before surgery and continuing for another 6 days (25) and was instructed to rinse her mouth with a 0.12% solution of chlorhexidine twice daily for 1 week. To avoid tooth fracture and minimize mechanical damage to the PDL, elevators were not used to luxate the tooth before extraction (Fig. 2*A*). A rubber dam was placed around the handle of the forceps to maintain constant pressure on the crown. The tooth was extracted gently with no intraoperative complications; subsequently, the patient was instructed to bite on moist gauze during the extraoral procedures.

The extracted tooth was gently rinsed with physiologic saline. Under a dental microscope (DF Vasconcellos, São Paulo, SP, Brazil), the