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Surgical management of maxillary incisor with palatal radicular groove and endodontic-periodontal lesion

KEYWORDS
Endodontic-periodontal lesion;
Intentional replantation;
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The palatal radicular groove (PRG) is a developmental anomaly most commonly found in maxillary incisors, with a reported incidence of 2.3 %–4.6 %.[1] It typically originates in the central fossa, crosses the cingulum, and extends apically beyond the cementoenamel junction (CEJ), terminating at various lengths and depths along the root.[1] These grooves are classified into three types based on their depth, length, and root canal complexity, with type III characterized as long and deep and often associated with a complex canal system.[2] Clinically, PRG are challenging because their depth and complexity increase the risk of localized periodontitis and pulpal involvement, with severe grooves reaching the apex often causing combined endodontic-periodontal lesions through plaque accumulation and pulp communication.[1,3,4] Treatment options for severe cases include intentional replantation, endodontic surgery, and extraction followed by implant placement.[1,3,5] We reported a 33-month follow-up case demonstrating the successful management of a maxillary lateral incisor with a type III PRG.

A 22-year-old female patient presented with swelling of the palatal gingiva of tooth 12 for 1 month. Intraoral examination revealed palatal gingival redness of tooth 12 (Fig. 1A). A developmental groove was evident, originating at the central fossa and crossing the cingulum. Periodontal probing on the palatal aspect measured approximately 9 mm (Fig. 1B). A preoperative radiograph was taken (Fig. 1C). A cone-beam computed tomography (CBCT) scan was taken (Fig. 1D–F). Based on clinical and radiographic findings, the groove was assessed to originate at the central fossa, cross the cingulum, and extend to the apex (Fig. 1G). The diagnosis of tooth 12 was an endodontic-periodontal lesion with a type III PRG. Given the thin buccal cortical plate and complete loss of the palatal plate, intentional replantation risked further compromising the buccal plate and required postoperative stabilization. As the patient preferred to preserve the tooth, endodontic microsurgery was chosen. Written informed consent was obtained.

Root canal retreatment was performed, and a periapical radiograph was taken (Fig. 1H). Under local infiltration anesthesia, a rectangular buccal mucoperiosteal flap was elevated from the distal aspect of tooth 13 to the distal aspect of tooth 22, along with a triangular palatal mucoperiosteal flap from the distal aspect of tooth 13 to tooth 21. The lesions associated with teeth 12 and 13 were exposed, and pus and granulation tissue were thoroughly curetted. The apical 3 mm of tooth 12 was resected, retroprepared, and filled with bioceramic material. The PRG was cleaned using an ultrasonic tip and prepared with a diamond bur, then filled with bioceramic material. The

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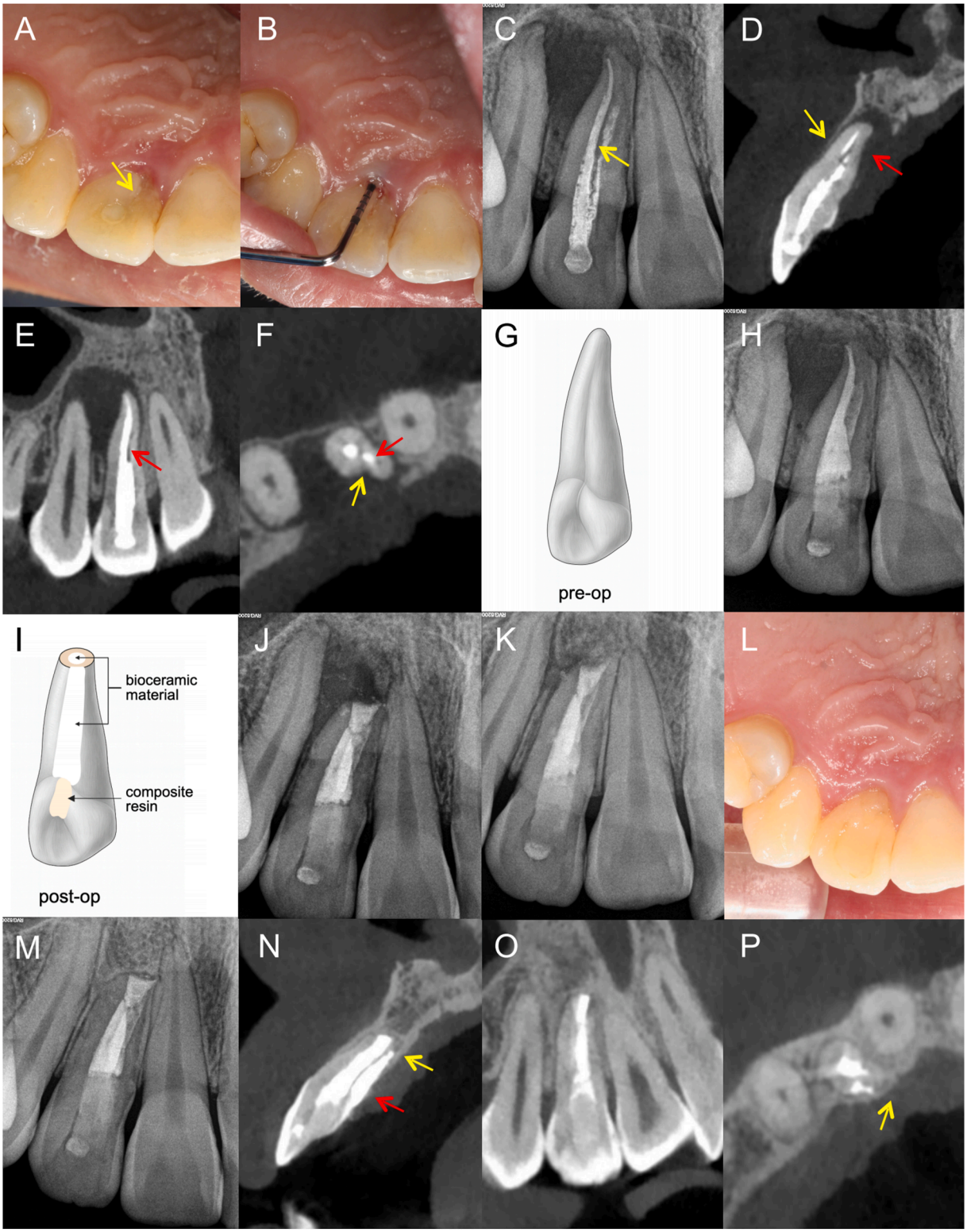

Figure 1 (A) Preoperative intraoral photograph showing gingival redness and swelling at the palatal margin of tooth 12. A developmental groove is evident, originating at the central fossa and crossing the cingulum (yellow arrow). (B) Periodontal probing on the palatal aspect of tooth 12 revealed a depth of approximately 9 mm, with purulent exudate from the gingival sulcus. (C) Preoperative periapical radiograph showing prior root canal treatment of tooth 12, with a radiopaque line on the mesial aspect suggestive of the palatal radicular groove (PRG, yellow arrow) and a large periapical radiolucency. (D) Sagittal cone-beam computed tomography (CBCT) section showing a thin buccal cortical plate (yellow arrow) and complete loss of the palatal cortical plate from the alveolar crest to the apex (red arrow). (E) Coronal CBCT section showing an extensive periapical radiolucency involving tooth 12 and extending distally toward tooth 13, with a gap between the lower root filling and the mesial canal wall

groove coronal to the CEJ was prepared with a diamond bur and restored using light-cured flowable composite resin (Fig. 1I). Guided tissue regeneration membranes were placed on both buccal and palatal aspects, and the flaps were sutured. A postoperative radiograph was taken (Fig. 1J). At the 12-month follow-up, the periapical lesion of tooth 12 showed significant healing (Fig. 1K). At the 33-month follow-up, tooth 12 remained asymptomatic with healthy palatal gingiva (Fig. 1L). A periapical radiograph (Fig. 1M) and CBCT scan were taken (Fig. 1N—P).

Declaration of competing interests

The authors have no conflicts of interest relevant to this article to declare.

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(red arrow). (F) Axial CBCT section revealing the PRG at the apex (yellow arrow) and an inadequately treated C-shaped canal cross-section (red arrow). (G) Schematic illustration demonstrating the palatal groove originating in the central fossa, crossing the cingulum, and extending to the apex. (H) Periapical radiograph after root canal retreatment showing adequate treatment and filling of the coronal half of the canal, with inadequate treatment and filling in the apical half. (I) Schematic diagram illustrating root-end resection, retropreparation, and retrofilling with bioceramic material. The two-segment restoration approach involves preparing the palatal groove from the cementoenamel junction (CEJ) to the apex and sealing it with bioceramic material, followed by preparing the groove from the CEJ to the lingual pit and restoring it with light-cured flowable composite resin. (J) Immediate postoperative periapical radiograph. (K) Periapical radiograph at the 12-month follow-up showing significant healing of the periapical lesion associated with tooth 12. (L) Intraoral photograph at the 33-month follow-up showing healthy gingiva around tooth 12, with intact composite restoration, no marginal discoloration, and no recurrent caries. (M) Periapical radiograph at 33 months showing complete healing of the periapical lesion. (N) CBCT sagittal section at 33 months showing complete periapical healing, with newly formed palatal cortical plate at the apex (yellow arrow), although the middle and coronal levels remain deficient (red arrow). (O) CBCT coronal section showing complete healing of the periapical lesions around teeth 12 and 13. (P) CBCT coronal section showing periapical healing and new bone formation on the palatal aspect of the apex of tooth 12 (yellow arrow). (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)