CASE REPORT

Combined endodontic therapy and periapical surgery with MTA and bone graft in treating palatogingival groove

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SUMMARY

A 37-year-old male patient reported to our department with chief complaint of pain and pus discharge from the labial marginal gingiva in the maxillary right lateral incisor region since last 4 months. Clinically, the tooth was hypersensitive to percussion and palpation but failed to respond to pulp sensitivity testing. After periodontal probing, a palatal groove was observed which started at the cingulum and travelled apically and laterally, associated with a pocket depth of 8 mm. Occlusal radiograph showed circumscribed radiolucency measuring 5 mm×7 mm in diameter at the apex of the tooth. A clinical diagnosis of chronic apical abscess was established. The case was treated with a combination of mineral trioxide aggregate and bone graft. At the 6-month follow-up visit, the tooth showed progressive healing without sinus track and sulcular bleeding.

BACKGROUND

The present case describes a combination of endodontic therapy and surgical intervention with use of mineral trioxide aggregate (MTA) and bone graft, respectively, for the treatment of palatogingival groove. The presence of a morphological defect called a palatogingival groove is considered to be an important contributing factor to the development of localised chronic periodontitis, for it favours the accumulation and proliferation of bacterial plaque deep into the periodontium. Hence, conventional endodontic treatment alone will not be effective because the bacterial aetiology is residing extra radicularly as a self-sustaining lesion. Therefore, in the present case a combination of endodontic therapy and surgical intervention was planned.

CASE PRESENTATION

A 37-year-old male patient reported to our department with chief complaint of pain and pus discharge from the labial marginal gingiva in the maxillary right lateral incisor region since last 4 months. There was no history of trauma and the medical history was non-contributory. Extraoral examination revealed palpable submandibular lymph nodes while the face was bilaterally symmetrical and lips were competent. Clinically, the tooth was hypersensitive to percussion and palpation but failed to respond to pulp sensitivity testing. There was grade I mobility in relation to the associated lateral incisor. After periodontal probing, a palatal groove was detected which started at the cingulum

Figure 1 Preoperative intraoral view of the palatogingival groove.

and travelled apically and laterally, associated with a pocket sized 8 mm in depth (figure 1).

INVESTIGATIONS

Biochemical and haematological investigations were normal, except the eosinophilic count which was 8%/mm³ (normal range 1–6%/mm³). Occlusal radiograph (figure 2) showed circumscribed radiolucency measuring 5 mm×7 mm in diameter at the apex of the tooth. A clinical diagnosis of chronic apical abscess was established.

DIFFERENTIAL DIAGNOSIS

Palatogingival grooves, when present, may contribute to the pathogenesis of periodontal and endodontic lesions. In the present case, formation of pocket and bacterial retention has lead to retrograde infection and inflammation of the pulp leading to the development of periapical abscess.

Figure 2 Radiograph (occlusal view) showing periapical pathology.

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The differential diagnosis of periapical abscess includes granuloma, radicular cyst, abscess and suppurative osteomyelitis. A periapical abscess usually manifests with severe pain; mobility and sometimes elevation of the involved tooth, swelling and tenderness to percussion. Palpation of the apical region elicits pain. Spontaneous drainage into the oral cavity through a fistula (parulis) may relieve the acute pain.

In case of periapical cyst the periphery usually has a well-defined cortical border. If the cyst becomes secondarily infected, the inflammatory reaction of the surrounding bone may result in loss of cortex or alteration of the cortex into a more sclerotic border. Osteomyelitis is a diffuse, uncontained inflammation of the bone most commonly found in the posterior mandible and rarely involving the maxilla.¹ Involvement of maxillary teeth with the absence of cortical plate expansion, which is commonly found in cyst or osteomyelitis, was a significant distinguishing factor in the diagnosis of the present case. The periapical radiolucency was ill-defined and the borders were hazy. History presented by the patient showed pus discharge which is more common in case of periapical abscess. Besides, the size of radiolucency present was larger than that of a granuloma which also had well-defined borders.

TREATMENT

Following the isolation of the tooth, the pulp chamber was opened and the entire necrosed pulp was removed. Biomechanical preparation was performed in the canal and copious irrigation with 1% sodium hypochlorite solution was carried out throughout the procedure. A full-thickness mucoperiosteal flap was reflected on the palatal and buccal aspects under local anaesthesia (figure 3). The palatogingival groove was sealed with MTA (figure 4). In the periradicular area, the granulosomatous tissue was carefully curetted and the apex of the tooth was resected (figure 5). A deep and wide root-end cavity was prepared using a round bur. The retrograde cavity was filled with MTA (MTA-Pro Root, Dentsply, Tulsa Dental Company) and decalcified freeze-dried bone allograft (Osseograft, Advanced Biotech Products, LTD, India) was filled in the bony defect to aid in healing. The flap on both sides was repositioned and sutured (figures 6 and 7). The tooth was then splinted with ribbon material and only single tooth (central incisor) was taken as an abutment. Owing to slight mobility in the affected tooth, single tooth splinting was done to aid in better healing.

OUTCOME AND FOLLOW-UP

The patient was asked to come for a regular follow-up but he did not turn up until 6 months. The patient returned for clinical and radiographic examinations 6 months after the treatment. At the 6-month follow-up visit, the lesion showed progressive

Figure 3 Palatogingival groove after elevation of mucoperiosteal flap.

Figure 4 Groove filled with mineral trioxide aggregate.

healing, no sinus track and the absence of sulcular bleeding (figures 8 and 9).

DISCUSSION

A palato-gingival groove is a developmental anomaly showing alterations in the growth and infolding of inner enamel epithelium and Hertwig's epithelial root sheath creating a groove that passes from cingulum of maxillary incisors apically onto the root. Consequently, periodontal pocket is formed resulting in retrograde infection involving the apex. Theoretically, this is an Endo-Perio lesion showing a classification of 'primarily periodontic origin resulting in an endodontic lesion'.² Different studies have revealed a prevalence rate for palatal groove of about 2.8–8.5%, the most prevalent being the maxillary lateral incisor.³ This defect can be treated successfully using combined endodontic and periodontal therapy. However, if clinicians are aware of the forms in which these conditions may occur and

Figure 5 Apicoectomy done and retrograde restoration with mineral trioxide aggregate.

Figure 6 Immediate postoperative intraoral view with sutures (buccal view).

can apply proper treatment modalities, a number of teeth with radicular lingual grooves can be saved. The present case reports the use of MTA and demineralised bone matrix allograft for the treatment of this anomaly. The groove can also be filled using glass ionomer cement as explained by Ballal *et al.*² or silver amalgam restoration as explained by Brunsvold⁴. MTA is reported to show good sealing ability and a high degree of biocompatibility.⁵⁻⁶ Bonson *et al.*⁷ found that clinically derived human gingival and periodontal ligament fibroblasts survived and proliferated in direct contact with MTA particles. The above studies are also supported by Balto,⁸ who found that human periodontal ligament fibroblasts attached to MTA within 4 h and then spread out over the surface during the subsequent 20 h. The hydrophilic nature of the particles from MTA powder allows its use even in the presence of moisture.⁹ Hence MTA was used as a retrograde filling material and to seal the palato-gingival groove. The surgical intervention aims to remove the infected root-end and seal any remaining bacteria in the root canal system from the periradicular tissues.¹⁰ In addition to the elimination of pathological tissues, periradicular surgery usually comprises root resection, preparation of root-end cavity and placement of a root-end filling material.¹¹

The demineralised bone matrix acts as an osteoconductive and possibly osteoinductive material.¹²⁻¹³ Hence the material could have promoted the healing in our case. Bioresorbable demineralised bone material is the protein component of bone

Figure 7 Immediate postoperative intraoral view with sutures (palatal view).

Figure 8 Postoperative intraoral view after 6 months.

and is widely used in various clinical conditions such as periodontal defects and oral and maxillofacial bone defect. Periodontal defects grafted with demineralised bone matrix allograft showed histological evidence of regeneration of new bone and periodontium.¹⁴ The vertical bone loss due to the periodontal lesion can be treated using bone graft materials as explained by Ballal *et al.*³ In the present case, the follow-up radiograph showed excellent healing with resolution of periapical pathology. After following the case for 6 months we have observed that there was uneventful healing, which shows that the prognosis of the tooth in the longer period is good.

Learning points

- ▶ The knowledge of tooth anatomy offers a strong base for establishing a perfect diagnosis.
- ▶ Evaluation of clinical signs and appropriate diagnostic tests are of paramount importance in order to prevent deterioration of attachment of apparatus.
- ▶ Combined endodontic—advanced periodontal regeneration treatment modalities can help us salvage the problems associated with such developmental anomalies.

Figure 9 Postoperative radiograph after 6 months.

Competing interests None.

Patient consent Obtained.

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