

Management of the Palato-radicular Groove Extending up to Root Apex with Mineral Trioxide Aggregate: A Case Report

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Abstract

MTA has been successfully used in the repair of furcal and root perforations, cervical resorption, apexification, root end filings, etc. This case report described the management of a rare palatal radicular groove by combined endodontic and periodontal surgery where MTA was used. Root canal treatment of the tooth was followed by periodontal surgery. After surgical exposure of the groove, it was debrided and filled with MTA to restore root contour and regenerate periodontal tissues. At 6-month follow-up, healing of apical lesion and reduction of periodontal pocket depth were seen radiographically and clinically.

Keywords: MTA, Radicular defect, Radicular groove.

INTRODUCTION

The palatal radicular groove is a developmental morphological anomaly that mainly affects the maxillary incisors. It has also been described as radicular lingual groove, distolingual groove, palatal gingival groove, and radicular palatal groove. The formation of palatal radicular groove is probably caused by infolding of the enamel organ and Hertwig's epithelial root sheath^[1] and has been speculated to be an aborted formation of an additional root.^[2]

These grooves usually begin in the central fossa, cross the cingulum, and extend apically for various distances and directions. The groove is of varying depth and may house openings of numerous accessory canals from the pulp to periodontium (Gao *et al.*, 1989).^[3]

The groove acts as locus for plaque accumulation, which destroys the sulcular epithelium and later deeper parts of the periodontium, ultimately resulting in the formation of a severe localized periodontal defect. These periodontal defects become very difficult to maintain for the patient. Lateral canals in the radicular groove are channels for the transfer of infectious material from periodontium into the pulp cavity and leading to primary periodontic and secondary endodontic lesions.

Depending on the severity of groove, its treatment can be elimination of groove by saucerization or simple restoration

to advanced periodontal regeneration therapy by bone grafting and periodontal membrane. Very severe forms may require extraction also. This case describes an extensive form of palatal radicular groove in maxillary lateral incisor, otherwise having poor prognosis, which was managed successfully by combined endodontic and surgical periodontal therapy. The rationale behind the use of MTA in filling the groove is discussed.

CASE REPORT

An 18-year-old male patient reported a draining sinus on the labial aspect of intact caries-free maxillary right lateral incisor, which tested non-vital. A groove running from the cingulum toward the root was found on the palatal aspect. A linear periodontal pocket of 9 mm seemed to extend up to root apex and was found on the palatal surface (Figure 1).

The tooth showed grade II mobility in an otherwise healthy oral cavity. A periapical radiograph showed a diffuse radiolucency

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at the apex and a radiolucent line running adjacent to the root canal (Figure 2).

On the basis of the clinical and radiographic findings, a diagnosis of a perio-endo lesion was made. A decision to endodontically treat the tooth followed by periodontal surgery was taken, explained to the patient, and an informed consent was obtained from the patient.

The tooth was isolated with a rubber dam before access preparation and working length was determined. Cleaning and shaping of the canal were done with crown-down technique and infection was controlled with calcium hydroxide. The canal was obturated by the lateral condensation of gutta-percha and AH Plus sealer.

The access cavity and the extra radicular groove on the crown were filled with resin composite. The mucoperiosteal flaps were elevated on both the labial and palatal aspects, to access the groove and degranulated the lesion. On surgical exposure, radicular groove was found mid palatally and running up to the apex of the root. A shallow bony defect was also noted on the labial aspect of root apex.

The groove was scaled, granulation tissue cleaned with ultrasonic tip and then filled with Mineral trioxide aggregate (Dentsply-Maillefer), taking extra precautions to seal the root end [Figure 3]. The flaps were repositioned and sutured. Pre-operative antibiotic therapy was continued for 3-day post-operatively along with non-steroidal anti-inflammatory drugs. Healing was uneventful and the sutures were removed after 1 week.

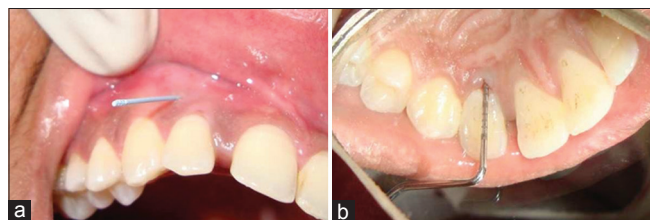


Figure 1: Pre-operative clinical images showing (a) labial alveolar draining sinus and (b) deep periodontal pocket associated with groove



Figure 2: Pre-operative (a) straight and (b) angled radiographs showing palatal radicular groove with apical radiolucency

At 6-month recall, the periodontal health of the lateral incisor was stable, the tooth mobility decreased and the depth of periodontal pocket reduced from 9 to 4 mm. Progression of hard tissue healing was noticed in the periapical radiograph taken at that time [Figure 4].

DISCUSSION

Palatal radicular grooves are developmental abnormalities seen primarily in maxillary incisor teeth, especially in lateral incisors. Reports show a prevalence rate of 1–5%.^[4-7] The groove impedes the removal of plaque and allows access to plaque microorganisms to the subgingival region. In many instances, periodontal attachment and bone loss can be found at the site of groove.^[5,8,9] Periodontal attachment loss continues even after the pulp space is obturated as three-dimensional sealing is difficult to achieve in the presence of numerous lateral canals opening in the groove. In the present case, a periapical radiograph showed radiolucent parapulpal line confirming the palatal radicular groove. As there was no history of trauma or caries, the existence of a communication from the palatal radicular groove into the pulp space was the most likely

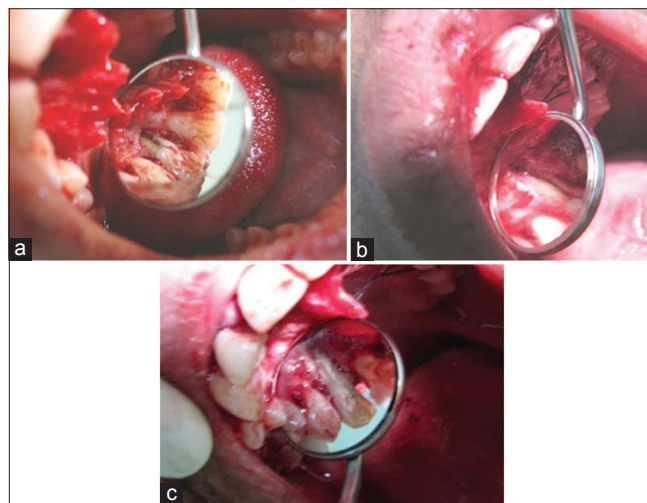


Figure 3: Clinical images as seen on reflection of flap. (a) Palatal radicular groove harboring calculus and extending up to the apex. (b) Deep groove after exposure and degranulation. (c) Groove after filling with MTA

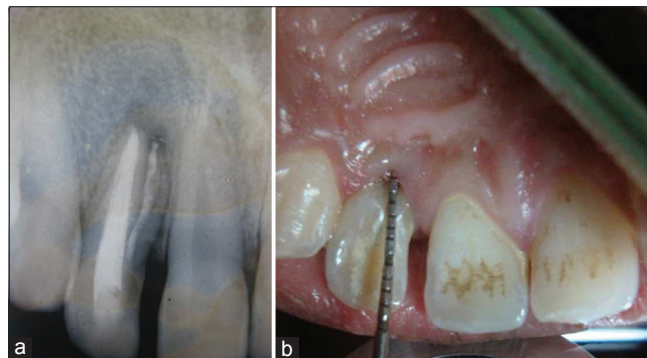


Figure 4: Six-month follow-up (a) Radiograph, (b) Clinical image showing reduced pocket depth

route of infection leading to necrosis of the pulp. Once the pulp becomes necrotic, endodontic therapy is indicated. However, conventional endodontic treatment alone will not suffice, because the bacterial etiology is residing extra-radicularly, as a self-sustaining lesion.^[10]

The goals of treatment of palatal radicular groove cases where loss of alveolar bone and periodontal attachment has taken place are (1) to effectively reduce the pathogenic bacteria in the area near the groove, (2) to eliminate the groove as a funnel for future plaque accumulation, and (3) to promote regeneration of lost periodontal tissues.^[11]

Materials, such as amalgam, composite resin, and glass-ionomer cement, have been used in the past to fill the palatal radicular groove.^[10,12,13] In this case, the groove was surgically exposed, cleaned ultrasonically and filled with MTA, thereby eliminating the depression for future plaque accumulation. It also sealed numerous openings of lateral canals in the groove, besides the apical foramen. MTA is biocompatible, has good sealing ability, and sets in the presence of moisture.^[14,15] It is the material of choice for repair of furcal^[16] and root perforation;^[17] cervical resorption;^[18] and root end fillings.^[19] It produces little or no inflammation in subjacent tissue and is found to regenerate cementum and periodontal tissue on its interface with them.^[15,16,20,21]

To regenerate the alveolar bone and periodontal attachment, instead of employing complex and expensive method of bone grafting, Emdogain, and GTR membrane application, we used simple and economical techniques of defect filling with MTA. Although clinically supporting tissues of the tooth seemed to be healthy periodontal tissues, further histological studies are required to find the type of tissue formed.

Amalgam and composite resin have been used in the past but periodontal reattachment cannot be expected to form on them. Glass ionomer cement has also been successfully used in such cases, but its manipulation in moist environment is difficult while the presence of little moisture and blood does not adversely affect the properties of MTA. The bone formation in the apical region reduced mobility and reduction in pocket depth are signs of success of the case and can be attributed to timely diagnosis and desired properties of MTA.

CONCLUSION

MTA can be used to seal radicular defects and has property to regenerate periodontal attachment.

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