



Mesial Radicular Groove – A Rare Unseen Conduit

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Abstract

Radicular groove is a developmental anomaly of teeth and studies quote that prevalence of mesial radicular grooves are rare. Located proximally, these grooves accumulate much plaque and calculus thus compromising the periodontal stability of the teeth. Detecting them at an earlier stage and treating them can help in minimizing the destruction of deeper structures of teeth. Two cases with mesial radicular groove have been reported here. Surgical modality was carried out to access the groove and restore it. Patients were followed up and significant improvement in their periodontal condition was noted. Thus, radicular groove when detected on time and treated appropriately could help in stabilizing the periodontal condition of the tooth. As a result, tooth mortality could be prevented. The following case report elaborates on two rare cases of mesial radicular groove and their management.

Keywords: Mesial Radicular Groove, Central incisor, Developmental Anomaly, Localised Periodontitis.

INTRODUCTION:

Since decades scientists have studied the diseases of the periodontium. Apart from dental plaque that causes periodontitis, there are various other factors that could lead to the development and progression of periodontal diseases. Several local factors act as obstacles and hinder the dental plaque removal and these include malposed tooth, anomalous tooth morphology, overhanging restorations and unfavourable gingival contours.¹ Palato-Radicular groove (PRG) is one such rare developmental anomaly. In 1908 Black described Radicular groove as an anomaly that begins near the tooth cingulum crossing the cemento-enamel junction (CEJ) and extending apically along the root surface with varying depths and lengths.² Radicular groove is formed during the process of odontogenesis by the infolding of the enamel organ and the Hertwig's epithelial root sheath. PRG is usually located on the palatal aspect of maxillary central and lateral incisors. Depending on the morphology of the radicular groove, the irregularity of the tooth structure and the absence of epithelial and desmodontal tissues in relation to the groove facilitates the deposition of plaque and calculus.³ If unnoticed, localized periodontitis may develop and, if allowed to progress, periapical pathology ensues.⁴ This article reports two cases of mesial radicular groove that were treated successfully.

CASE DESCRIPTION:**CASE 1:**

A 22 year old female patient reported to the department of Periodontology with a chief complaint of pain in relation to upper front teeth region. On clinical examination, plaque deposits were found in relation to 11. The marginal gingiva and the associated interdental papilla were inflamed. Bleeding on probing was present and the tooth presented with a probing depth of about 7mm mesially (Figure 1A). Careful examination revealed a groove like structure extending from the cingulum apically on the mesial side of the tooth. Also 11 appeared to be extruded, associated with midline diastema and grade I mobility. There was no history of previous trauma. Presence of Palato-Radicular groove was suspected. Intra-Oral periapical Radiograph was taken with gutta percha and the presence of Palato-radicular groove extending from the cingulum onto the root along the mesial surface was confirmed (Figure 1B). Interdental Bone loss was present between 11 and 21. The tooth was vital and there was no associated periapical pathology.

Scaling and root planing was carried out in relation to 11 and the patient was re-evaluated after a month. The patient presented with persistent probing depth. Under Local Anaesthesia, a full thickness mucoperiosteal flap was raised in relation to 11. Debridement was carried out and the groove was inspected and sealed with flowable composite (Figure 1C & Figure 1D). The flaps were then approximated and sutured with 3-0 black silk (Figure 1E). Paracetamol 500 mg TDS for 3 days and Amoxycillin 500 mg TDS for 5 days were prescribed to the patient post procedure. Also 0.2% chlorhexidine mouthrinse twice a day for 4 weeks was prescribed. Sutures were removed after a week and follow up done after one month and six months revealed considerable reduction in probing depth and mobility in relation to 11 (Figure 1F & Figure 1G).



Figure 1A: Pre-operative view of 11 showing 7mm mesial probing depth



Figure 1B: Pre-operative Radiograph tracing the Palato-radicular groove with gutta percha in relation to 11



Figure 1C: Open Debridement done and Mesial Palato-Radicular Groove exposed in 11



Figure 1D: Groove restored with flowable Composite in 11



Figure 1E: sutures placed



Figure 1F: Post - Operative view showing reduced probing depth (3mm) in 11



Figure 1G: Post - operative Radiograph

CASE 2:

A 20 year old female patient, presenting with a chief complaint of forwardly placed upper front teeth reported to the department of Periodontology. Clinical examination revealed the inflammation of marginal gingiva and interdental papilla in relation to 11 associated with bleeding on probing. Probing depth of about 5mm was present mesially in relation to 11 on the palatal aspect of the tooth (Figure 2A) and the teeth presented with grade I mobility. Midline diastema was present between 11 and 21 with slight extrusion of 11. Presence of palato-Radicular groove was suspected in relation to mesial aspect of 11 and it was confirmed by taking intraoral periapical radiograph by placing a gutta percha tracing the groove (Figure 2B). Also, the radiograph revealed vertical bone loss between 11 and 21. There was no history of any trauma. The tooth was vital with no periapical pathology.

Phase I therapy was initiated and the patient was reviewed after a month. Probing depth was still persistent in relation to 11. A full thickness mucoperiosteal flap was elevated in relation to 11 under local anaesthesia and debridement was carried out (Figure 2C). The radicular groove was inspected carefully and restored with a flowable composite (Figure 2D). The flaps were approximated and sutured with 3-0 black silk (Figure 2E). The patient was prescribed with post operative medications that consisted of Paracetamol 500 mg TDS for 3 days, Amoxycillin 500 mg TDS for 5 days and 0.2% chlorhexidine mouthrinse twice a day for 4 weeks. After a week the sutures were removed and the patient was followed up after one month and six months. Considerable reduction in probing depth and mobility was observed in relation to 11 (Figure 2F & Figure 2G).



Figure 2A: Pre-operative view of 11 Showing 5mm probing depth



Figure 2B: Pre-operative Radiograph tracing the Palato-radicular groove with gutta percha in 11



Figure 2C: Open Debridement done and Mesial radicular Groove exposed in 11



Figure 2D: Groove sealed with flowable composite in 11



Figure 2E: sutures placed



Figure 2F: Post - operative view showing reduced probing depth (2mm) in 11

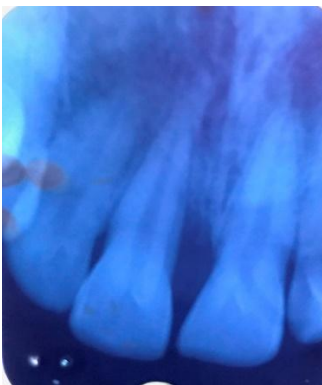


Figure 2G: Post – operative Radiograph

DISCUSSION:

Kogon et al., classified the grooves into mesial, distal and central (mid-palatal) depending on their location.⁵ Albaricci MF et al studied 376 maxillary lateral and central incisors and observed a higher prevalence of palato-radicular groove in lateral incisors with proximal localization.⁶ Withers et al studied 2099 maxillary incisors in 531 trainees and observed that the prevalence of Palato-radicular groove in lateral incisors was 4.4% and the central incisors 0.28%. The groove usually starts from the cingulum of the affected teeth and then follows a disto-apical course along the root surface. Prevalence of Mesio-apical groove is much less than the groove that runs in disto-apical direction.⁷ Both of our cases presented with mesial radicular grooves in Central incisors and to the best of our knowledge Central Incisors presenting

with mesial grooves have been rarely documented so far in literature. Distal and mesial locations of the groove are more harmful than mid-palatal. If the groove is located proximally, chances of bacterial plaque accumulation are much high and pose a greater difficulty in plaque removal. This anatomical anomaly can serve as a pathway for infection, leading to the destruction of periodontal tissues and the formation of localized periodontal lesions.⁸ Grooves are much deeper immediately after root formation but becomes shallower on aging and this is attributed to increased cementum deposition.⁹ Extension of the groove onto the root surface apical to the cervical region of the crown, stands to determine the prognosis.¹⁰ Suggested therapeutic modalities include odontoplasty, surgical curettage, restoration of the groove thus eliminating the pathway of infection. In both the above cases the grooves were simple and less complicated. Tracing with Gutta percha revealed that the grooves terminated onto the middle third of the root surface and there was no pulpal communication as revealed by thermal vitality tests in both the above presented cases. Also, there was no associated periapical lesion. Thus, open flap debridement was carried out. Several materials like composite¹¹, amalgam¹², calcium sulphate¹³ and GIC (Glass Ionomer Cement)¹⁴ have been used in various studies to seal the groove and in our case flowable light cure composite was used to seal the groove. Sealing the Palato-Radicular groove eliminates plaque retention, bacterial colonization thus terminating periodontal disease advancement. Follow-up revealed good gingival adaptation to the restored groove, and both probing depth and mobility were considerably reduced.

CONCLUSION:

Detection of radicular grooves at an earlier stage can prevent the advancing periodontal and endodontic pathosis of the involved teeth. Most of the time, due to its location, the radicular groove remains undetected. As a part of routine clinical examination, the proximal and palatal/lingual surfaces of the incisors should be examined so that the radicular groove, if present can be treated concurrently so that further destruction of deeper tooth structures can be prevented. Also, the concerned teeth should be re-evaluated periodically for patient's well being.

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