Management of Palato-radiclar Groove using concentrated Growth Factor

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Abstract:
An important predisposing factor for localized periodontal disease is the developmental anomaly of palatoradicular groove. The elimination of groove which acts as nidus, and regeneration of lost periodontium using concentrated growth factor and guided bone regeneration to control disease progression has been discussed.

Key words: Palato radicular groove, osseous defect, concentrated growth factor, guided bone regeneration.

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Introduction

Palatoradicular groove is a developmental morphological anomaly of the maxillary incisor tooth which is often associated with severe localised periodontitis. The prevalence of palatoradicular groove is 2.8%–8.5%, the occurrence varying in different populations and subpopulations.¹,² It is most commonly seen in the maxillary lateral incisors and less frequently in the central incisors.

The cause for palate radicular pathogenesis is yet unclear. The palatal groove is thought to represent an external defect adjacent to gingival crevice due to an infolding of the enamel organ and Hertwig’s root sheath.³ the alteration of genetic mechanisms may contribute to etiopathogenesis.⁴ The groove provides the site or pathway for bacteria to penetrate into the periodontal ligament area, resulting in a periodontal pocket along the length of the groove.⁵

This case report discusses the use of open flap surgery combined with concentrated growth factor and osseograft as graft material and CGF membrane which successfully treated the severe periodontal destruction associated with deep palatoradicular groove.

Definition and other names

The palato-radicular groove can be defined as a linear depression starting at the junction of the lingual cingulum with one of the lateral marginal ridges and continues apically to the proximal surface of the root, possibly reaching the apex.⁶,⁷ Radicular grooves are quite variable in their depth and also the distance and direction traversed down the root.⁸ The various terms used to describe this anomaly are: Palato-gingival groove, developmental radicular anomaly, distolinguinal groove, radicular lingual groove.⁹,¹⁰,¹¹
Classification

On the basis of severity:

1. Type I: the short groove (not beyond the coronal third of the root)
2. Type II: the long groove and shallow (extending to the coronal third of the root)
3. Type III: the groove is long and deep (beyond the coronal third of the root).

Etiopathogenesis

Due to the close approximation of the radicular groove with the periodontal tissues it provides a pathway for bacteria to penetrate into the periodontal ligament area causing localized inflammation. Once there is disruption of the periodontal attachment and the groove is involved, a self-sustaining localized periodontal pocket can develop along the length of the groove. The purpose of this paper is to report a case involving a maxillary left central incisor with a type III deep palatal groove and associated large intra bony defect. A combined treatment approach involving both nonsurgical endodontic therapy and periodontal surgical management resulted in periodontal healing and resolution of the vertical defect.

Case report

A 29 year old male patient reported with chief complaint of bleeding on brushing from palatal aspect of upper left central incisor for past 6 months. Patient gave history of receding gums for past 3 months. Patient revealed no positive medical history. On examination the gingiva was apparently healthy with fair oral hygiene status and in palatal aspect of tooth 21, 22 soft deposit was present, gingiva was slightly inflamed with localized gingival recession in 21. Bleeding on probing was positive with probing depth of 3 mm in buccal aspect, 7 mm in mesial palatal, 10 mm in mid palatal, 8 mm in distopalatal regions. Deep palato radicular groove extending till middle of the root was probed. Intra oral periodical radiograph revealed arc shaped intra bone defect extending beyond the middle third of the root with loss of lamina dura [figure 1]. With these findings case was diagnosed as localized chronic periodontitis with deep palato radicular groove. At the initial appointment oral prophylaxis and proper oral hygiene instructions were performed. At 1 week interval scaling root planing was done and antibiotics prescribed are amoxycillin 500 mg TDS for 5 days and metronidazole 400 mg BDS for 5 days. Review was done after 3 weeks and deep pocket was still present, therefore we decided to do prophylactic surgery in order to eliminate this underlying problem. At this patients was explained about guided tissue regeneration using CGF and bone grafts. Under local anaesthesia, access flap was elevated from 11, 21, 22, 23 region, debridement degranulation was done. To remove the palatoradicular groove odontoplasty was done [figure 3]. From patient 18 ml of venous blood was withdrawn, centrifuged and CGF was prepared, one portion of CGF was mixed with osseous graft and placed in the pre sutured intra bony defect, [figure 4] other portion was beaten into membrane [figure 5] and placed over the graft to to cover 2–3 mm beyond the bony defect.
The flap was positioned back and stabilized with simple interrupted suture. Postoperatively, Amoxicillin 500 mg tid for 7 days, Diclofenac potassium 50 mg bid for 5 days, and 0.12% CHX mouthwash 2 times a day for 4 weeks were prescribed.

Suture removal was done after a week. One month after the surgery, the gingiva appeared healthy, during this period, the patient maintained meticulous oral hygiene. Postoperative review was done by 3 months and pocket probing depth, CAL, are improved. IOPA taken at 3 months showed bone formation at the apex and shows regeneration. [Figure 6]

A variety of treatment modalities have been proposed in this regeneration aspect. Guided tissue regeneration with concentrated growth factor scaffold is one among that. The amount of periodontal regeneration and the extension of ECM formation were significantly influenced by the quality and duration of space-maintaining wound stabilization and inflammatory reactions caused by infections in the defect area.

The principles of regeneration have been studied since the 1970s, when Melcher suggested that the periodontal ligament cells have the ability to promote new cementum, periodontal ligament, and bone formation (periodontal regeneration). Anderegg and Metzler reported 10 cases of palatoradicular groove treated using GTR with significant reduction in probing depth (5.0±0.8 mm) and gain in attachment level (5.3±0.9 mm). Jung et al. reported a case in which tooth fracture 7 was successfully treated by radiculoplasty, bone graft with demineralized freeze-dried...
bone allograft, and placement of a non-absorbable membrane.\textsuperscript{15} Postoperatively, substantial resolution of the osseous defect and about 6 mm of probing attachment gain was recorded. Hence guided bone regeneration was the technique preferred in this case.

One of the important factors for regeneration is growth factors. CGF has a good regenerative capacity and highly versatile on sinus and alveolar ridge augmentation (Sohn et al., 2009).\textsuperscript{16} TGF-b1 and VEGF, are the growth factors present and stimulate cell proliferation, remodelling of matrix, angiogenesis during the process of healing.\textsuperscript{17,18,19}

In the treatment of intrabony defects, GTR procedures, as compared with open flap debridement controls, resulted in significantly more favorable gains in CAL and PD reduction.\textsuperscript{20} In the treatment of intrabony defects, meta-analysis did not show any statistically significant superior results among barrier types evaluated.\textsuperscript{20} Hence a periodontal defect caused by palato radicular groove when treated with guided tissue regeneration using CGF and osseograft gives better regeneration.

**Conclusion:**

The diagnosis of the palatoradicular groove is critical due to the diagnostic complexity and these grooves are thought to act as tunnel for accumulation of plaque and calculus. Periodontal health has to be interpreted properly and treated accordingly. Although several studies have proved, clinically and radiologically the periodontal regeneration in osseous defects with CCF and osseograft and gives good clinical results in the osseous defect caused by palate radicular groove. Further controlled studies to confirm the advantages of this technique over conventional treatment modalities are required.
References


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