Case Series

Different Periodontal Approaches for Management of Palatogingival Groove – A Case Series

Dr. R. Loganayagi[1], Dr. T. T. Karthikeyan[2], Dr. Vidya Albert Yen[3]

[1]Senior Resident, Department of Dental Surgery, Government Tiruvannamalai Medical College, Tiruvannamalai, Tamil Nadu, India.
[2]Senior Resident, Department of Dental Surgery, Government Tiruvannamalai Medical College, Tiruvannamalai, Tamil Nadu, India.
[3]Professor, Department of Dental Surgery, Government Tiruvallur Medical College, Tiruvallur, Tamil Nadu, India.

Corresponding Author
Dr. R. Loganayagi, Senior Resident, Department of Dental Surgery, Government Tiruvannamalai Medical College, Tiruvannamalai, Tamil Nadu, India.

ABSTRACT
Palatogingival groove is one of the developmental anomaly that is used to be common in the palatal aspect of maxillary anterior teeth. Because of its anatomical position and varying severity it may leads to periodontal and endodontic complications, which necessitate its early identification by clinicians. Based on the severity, the treatment options varies like simple scaling and root planning, radiculoplasty to complicated endodontic-periodontal management. This article is presented with three different scenarios and the varying periodontal approaches to manage the clinical condition.

Keywords: Palatogingival groove, microbial colony, probing depth, radiculoplasty

INTRODUCTION
Palatogingival grooves also referred in various terms as palato radicular groove, disto lingual groove, corono radicular grooves are one of the developmental malformations affecting mostly the palatal aspect of maxillary incisors.[1,2] The groove usually formed around the cingulum and may continue apically in mesial, distal or midpalatal root surfaces and terminate at various lengths and depths along the root.[3] Studies have shown that the extension of groove in lateral incisor was found to be less than 5mm in 43% of cases, between 6-10mm in 47% of cases and only 10% of cases the groove had extended beyond 10mm of root.[4] The etiology behind the development of this groove is still controversial, and it is postulated that it may be due to infolding of enamel organ and Hertwig epithelial root sheath during root formation[5] or may be due to an attempt of formation of additional root[6,7] or may be due to altered genetic mechanism.[8]
The problem with this groove is that it may act as a nidus for accumulation of plaque or calculus, which may lead to periodontal inflammation and can ensue into periodontal pocket formation[9] with attachment loss and alveolar bone loss. This primary periodontal infection may also leads to secondary endodontic involvement by infecting pulp canal either through the accessory canals or through apical portion.[10,11] Diagnosis and treatment planning is important in clinical practices as delay in early identification may lead to extensive involvement both periodontally and endodontically.

eISSN 1303-5150

Case Series

The principle behind managing the PGG must be based on the involvement of pulp and then periodontal therapy for complete elimination of microbial colony, morphological alteration of the groove and on attempting periodontal regeneration. This paper mainly focused on different periodontal approaches that may be used for the management of PGG depending on the condition of the teeth.

Case Report 1

A 40 year old male patient came to our Department of dentistry with the complaints of pain in the right upper front teeth on and off for the past one month. On clinical examination, there was no detectable caries, nor signs of fracture noted in the offending maxillary right lateral incisor. Tenderness on percussion was positive and on careful palatal examination, an infolding was noted in the cingulum region showing a deepened groove. Periodontal probing of the mid palatal region shows a probing depth of 7mm. Tooth vitality revealed partial vitality and the intraoral periapical radiograph shows periapical widening in the root. Hence the condition was provisionally diagnosed as developmental anamoly of palatogingival groove resulting in apical periodontitis. Endodontist opinion obtained and proceeded with single sitting root canal treatment. After obtaining informed consent, under local anesthesia mucoperiosteal flap was raised from the palatal aspect of 11 to 13. Granulation tissue was debrided, a deepened groove extending to the midroot of palatal aspect of 12 was noted along with three walled osseous defect. With high speed airotar handpiece and using round bur the groove was slightly deepened and glass ionomer cement was packed. As the osseous defect is contained, demineralized bone matrix (Osseograft), a xenograft material was packed inside the defect and flap was approximated back with suturing. Periodontal pack was placed and medications were prescribed. Immediate post operative period was uneventful. Three months follow up and one year followup shows successful healing of the tooth with nil complaints from patient aspect and probing depth was greatly reduced.

Figure 1a: Pre operative Images

eISSN 1303-5150

Case Series

Figure 1b: Intraoperative Images Showing Deepened Groove Filled With Gic And Osseous Defect Filled With Graft Material

Figure 1c: Post Operative Images

Case Report 2

A 32 year old male patient came to our Department of dentistry with the complaints of pain and swelling in the upper left front tooth for past 5 days. History revealed recent increased spacing between lateral incisor and canine and slight mobility in lateral incisor. On examination, there was a swelling in the labial gingiva of left lateral incisor with pus discharge on pressure. Tooth was found to be slightly extruded and pathological migration was observed. No dental caries nor signs of fracture/trauma to tooth was noted. Palatal examination of tooth shows a groove running from cingulum region to root along the lateral aspect of lateral incisor. Probing depth was measured and it was found to be 9mm along labial aspect and 6mm in palatal aspect. Oral hygiene was good. IOPA reveals alveolar bone loss upto the middle third of root. Endo perio lesion was diagnosed provisionally due to the palatogingival groove and prognosis was explained to the patient, as patient wants to

eISSN 1303-5150

Case Series

conserve the tooth multidisciplinary approach was planned. As tooth was found to be nonvital, endodontist opinion obtained and root canal therapy was completed in multiple visits. After obtaining informed consent, under aseptic condition, local anesthesia was administered. Mucoperiosteal flap was raised using vertical incisions in relation to 21 to 23 labial and palatal aspect. After careful debridement of granulation tissues using Gracey curettes, a wide osseous defect was noted in the labial aspect of the lateral incisor and in the palatal aspect the palatal groove was found to be shallow and was running upto the middle third of root. Using airotar handpiece and round bur, mild saucerisation done and Glass Ionomer cement was packed. The labial osseous defect was filled with demineralized bone matrix (Osseograft), a xenograft material and a GTR membrane (Healiguide) was placed and secured with sutures. Finally the flap was approximated and suturing was done and protected with periodontal pack. Occlusion was relieved and interim splinting was done. Immediate postoperative review was uneventful. Three months and six months follow up showed excellent prognosis with decreased swelling, mobility and probing depth.

Figure 2a: Pre operative Images

eISSN 1303-5150

Case Series

Figure 2b: Intraoperative images

Figure 2c: Post Operative Images

Case Report 3

A 24 Year female patient reported to our Department of Dentistry with the complaint of swelling in the upper left front teeth for the past 10 days. Clinical examination in relation to the offending upper left lateral incisor shows absence of caries, fracture. There was a periapical labial swelling with tenderness on percussion. Palatal examination revealed a small groove running on the mesial aspect of cingulum region and the tooth was found to be slightly labially displaced. Intraoral periapical radiograph shows periapical widening and the tooth was found to be nonvital. Probing depth on the palatal aspect found to be 6mm. After completing endodontic management, periodontal flap surgery was planned. Mucoperiosteal flap was raised in the palatal aspect of 21 to 23, granulation tissue was curetted. The groove was found to be very shallow and hence radiculoplasty was done with polishing bur. The flap

eISSN 1303-5150

Case Series

was repositioned and sutured. Immediate postoperative session was uneventful. Three months and six months follow up was done and the prognosis was found to be satisfactory as there was nil complaint and the tooth was found to be periodontally stable.

Figure 3a: Pre operative Images

Figure 3b: Intraoperative images

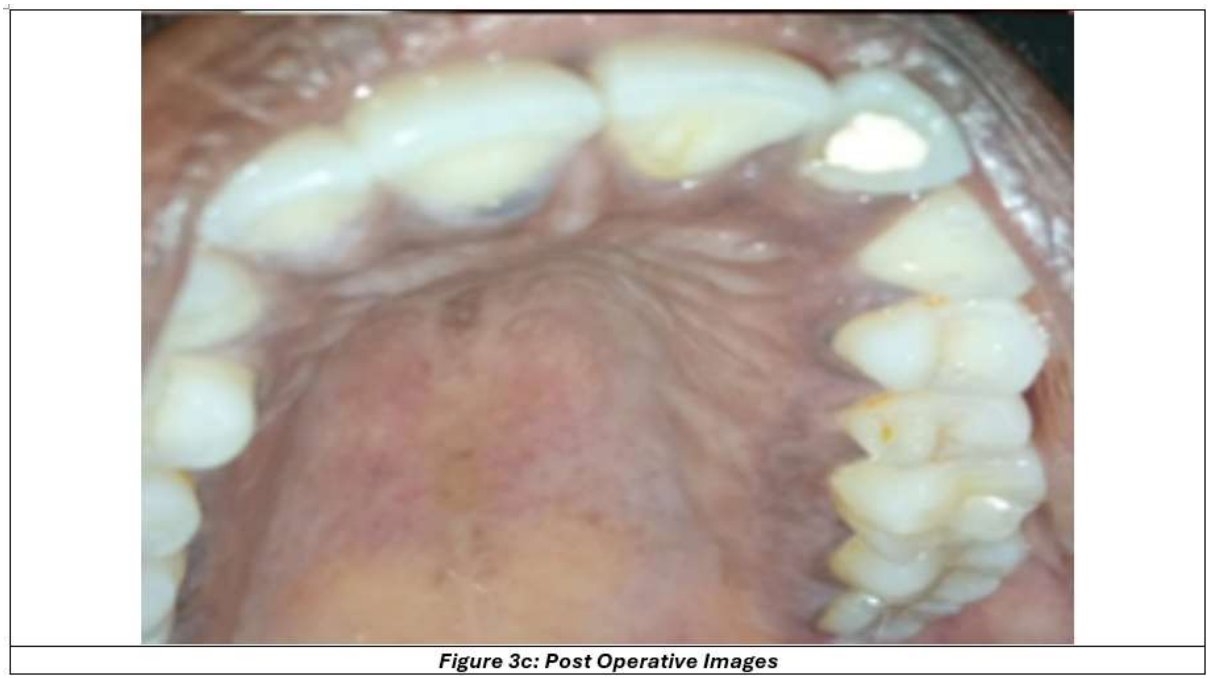

Figure 3c: Post Operative Images

DISCUSSION

Palatogingival grooves are although an uncommon root anomaly, they are mostly associated with periodontal lesion that necessitates early diagnosis and treatment. The groove may be classified based on its location as mesial, distal or central[12], based on length as mild,

eISSN 1303-5150

moderate or complex,[7] based on depth as shallow if <1mm, deep>1mm or rarely as closed tube[12] and finally based on associated periodontal intrabony defect present or not.[13]

Various case reports shows that the presentation of PGG symptomatically varies and it may be reported as dull intermittent[14] or acute pain,[15] sometimes with mobility of teeth,[16] tenderness on percussion[17] pus discharge[18] or with sinus tract formation[19] or with gingival swelling[14] or can also be found in asymptomatic conditions. In our case series also case report 1 presented with occasional pain but positive for tenderness, case report 2 presented with pain, gingival swelling, pus discharge, mobility, pathological migration, deep probing depth all suggesting of severe periodontal destruction, and case report 3 presented with pain and mild periapical swelling. Vitality tests shows partial response in case report 1 and negative in case report 2 and 3.

A decisional tree was illustrated in a systematic review by[20]Yvan Gaudex, Vianney Gandillot for management of PGG associated lesions. It should first depend on endodontic status and after careful assessment, in case of negative pulp response and periapical lesions, endodontic treatment has to be undertaken first[21] and if positive response, endodontic management can be deferred, in our case reports one case shows partial response but had mild periapical widening in IOPA and two other cases were non vital, so all the cases were endodontically managed.

Moving onto the periodontal management, first scaling with root debridement was done and oral hygiene instructions were given in all the three cases. Rationale behind the treatment should be preventing further plaque accumulation in the groove by doing morphological alteration and sealing of the groove, if necessary using restorative materials, attempting periodontal therapy for periodontal reattachment/ regeneration. Similar to the decisional tree given in the systematic review,[20] based on the depth and the length of the groove extension, only radiculoplasty was attempted in case report 3, but in case report 1and 2 as the groove extension was deep and extended upto the middle third of the root, saucerization with GIC restoration was done. Many biocompatible materials which are ideal for subgingival restoration was used in various case reports like amalgam,[22] GIC,[23,24] bioceramic materials, silicate cements[25] etc., and we have used Glass ionomer cement in our cases under proper isolation similar to study by Hungund et al.[23]

Considering the periodontal approach of the associated intra bony defect, the management depends on the morphology of the intra bony defects i.e., width, depth and number of residual bony walls and on the soft tissue available to cover the defect. Various regenerative materials can be used like alloplastic graft materials, PRP, PRF,[25] DFDBA etc., for filling the intrabony defects. Similar to case reports by Sooratgar[26] et al, Schwartz et al,[27] Mathews et al[28] in our case report 1 for the palatal intrabony three walled defect, DFDBA graft material was used and in case report 2, where there is wide labial osseous defect along with DFDBA, a resorbable collagen GTR membrane was used. Combined usage of GTR/graft prevents downward epithelial growth and favours regeneration of lost periodontal tissues.[29] Results achieved in case report 1 and 2 was very satisfactory as the probing depth was greatly reduced and patient is asymptomatic similar to studies by Anderegg and Metzler.[30] Although radiculoplasty and open flap debridement alone was done in case report 3, the healing was satisfactory in a six months review.

CONCLUSION

Palatogingival grooves though a rare root anamoly, mere presence of it does not means that pathology will develop in that tooth. Grooves that extend subgingivally in the root surface may act as a source of plaque accumulation, resulting in breach in epithelial attachment and subsequent advancing periodontal inflammation and in some cases endodontic lesions. Therefore careful examination of lingual surfaces of maxillary anterior teeth should be

eISSN 1303-5150

encouraged as a part of clinical examination, thus early identification will prevent severe endo perio lesions. An adequate decision making and treatment planning is needed as the cases may present different scenarios. Inderdisciplinary approach is needed in many cases and the concerned tooth must be maintained and kept under constant re -evaluation for a successful outcome.

REFERENCES

[1] Glossary of Endodontic Terms. American Association of Endodontics. 10th edn. 2020.
[2] Kogon SL. The prevalence, location and conformation of palato-radicular grooves in maxillary incisors. J Periodontol 1986;57(4):231-4.
[3] Lee KW, Lee EC, Poon KY. Palato-gingival grooves in maxillary incisors. A possible predisposing factor to localised periodontal disease. Br Dent J 1968;124(1):14-8.
[4] Rachana D, Nadig P, Nadig G. The palatal groove: Application of computed tomography in its detection- a case report. J Conserv Dent 2007;10(3):83-8.
[5] Gound TG MGI. Treatment options for the radicular lingual groove: a review and discussion. Pract Periodontics Aesthet Dent 1998;10:369-75.
[6] Ennes JP, Lara VS. Comparative morphological analysis of the root developmental groove with the palato-gingival groove. Oral Dis. 2004;10:378-82.
[7] Goon WWY, Carpenter WM, Brace NM, et al. Complex facial radicular Groove in a maxillary lateral incisor. J Endod 1991;17(5):244-8.
[8] Mittal M, Vashisth P, Arora R, et al. Combined endodontic therapy and periapical surgery with MTA and bone graft in treating palatogingival groove. BMJ Case Rep 2013;2013:bcr2013009056.
[9] Simon J. Predictable endodontic and periodontic failures as a result of radicular anomalies. J Oral Maxillofac Surger Oral Surg 1971;42:823–6.
[10] Sharma S. Palatogingival groove: recognizing and managing the hidden tract in a maxillary incisor : A case report. J Int Oral Health 2015;7(6):110-4.
[11] Gao Z, Shi J, Wang Y, et al. Scanning electron microscopic investigation of maxillary lateral incisors with a radicular lingual groove. Oral Surg Oral Med Oral Pathol 1989;68:462-6.
[12] Kogon S. The prevalence, location and conformation of palato- radicular Grooves in Maxillary Incisors. J Periodontol 1985;57:231-4.
[13] Al-hezaimi K, Frcd C, Naghshbandi J. Successful treatment of a radicular groove by intentional replantation and Emdogain therapy: four years follow-up. YMOE 2009;107(3):e82-5.
[14] Arora V, Srinivas SR, Arora P, et al. Surgical management of a palatal radicular groove and an associated periodontal lesion in a maxillary lateral incisor. J Pierre Fauchard Acad (India Section) 2009;23(3):104-6.
[15] Forero-López J, Gamboa-Martínez L, Pico-Porras L, et al. Surgical management with intentional replantation on a tooth with palato-radicular groove. Restor Dent Endod 2015;40(2):166-71.
[16] Ballal NV, Jothi V, Bhat KS, et al. Salvaging a tooth with a deep palatogingival groove: an endo-perio treatment– a case report. Int Endod J 2007;40(10):808-7.
[17] Rajendran M, Sivasankar K. Palato-radicular groove hidden route to destruction-case report. Int J Curr Res Rev 2013;5:85-92.
[18] Gandhi A, Yadav P, Gandhi T. Endodontic-periodontal management of a maxillary lateral incisor with an associated radicular lingual groove and severe periapical osseous destruction-a case report. J Ir Dent Assoc 2012;58:95-100.
[19] Castelo-Baz P, Ramos-Barbosa I, Martín-Biedma B, et al. Combined Endodontic Periodontal Treatment of a Palatogingival Groove. J Endod 2015;41(11):1918-22.

eISSN 1303-5150

Case Series

[20] Gaudex Y, Gandillot V, Fontanille I, et al. Palatal groove associated with periodontal lesions: a systematic review illustrated by a decisional tree for management. BMC Oral Health 2024;24(1):1037.
[21] Attam K, Tiwary R, Talwar S, Lamba AK. Palatogingival groove: endodontic-periodontal. J Endod 2010;36(10):1717-20.
[22] Friedman S. The radicular palatal groove - a therapeutic modality. Endod Dent Traumatol 1988;4:282-6.
[23] Hungund S, Kumar M. Palato-radicular groove and localized periodontitis: a series of case reports. J Contemp Dent Pract 2010;11(5):1-8.
[24] Hans M. Management of lateral incisor with palatal radicular groove. Indian J Dent Res 2010;21(2):306-8.
[25] Karunakaran JV, Fenn SM, Jayaprakash N, Ragavendran N. Successful surgical management of palatogingival groove using platelet-rich fibrin and guided tissue regeneration: a novel approach. J Pharm Bioall Sci 2017;9:268-73.
[26] Sooratgar A, Tabrizizade M, Nourelahi M, et al. Management of an endodontic-periodontal lesion in a maxillary lateral incisor with palatal radicular groove: a case report. Iran Endod J 2016;11(2):142–5.
[27] Schwartz SA, Koch MA, Deas DE, et al. Combined endodontic periodontic treatment of a palatal Groove: a case report. J Endod 2006;32(6):573-8.
[28] Mathews D. Interdisciplinary management of a maxillary central incisor with a palato-radicular groove: a case report with 27 years follow-up. J Esthet Restor Dent 2021;33:1077-83.
[29] Mcclain PK, Schallhorn RG. Long-term assessment of combined osseous composite grafting, root conditioning, and guided tissue regeneration. Int J Periodontics Restor Dent 1993;13:9-27.
[30] Anderegg CR, Metzler DG. Treatment of the palato-gingival groove with guided tissue regeneration. Report of 10 cases. J Periodontol 1993;64(1):72-4.

eISSN 1303-5150