Case Report
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Periodontal Management of Palatogingival Groove – Case Report

Jaishree Tukaram Kshirsagar*, Kokhila S. and Vidya Albert

Department of Periodontics and Implantology, Tamil Nadu Government Dental College and Hospital, Chennai – 600003, Tamil Nadu, India; jaishreekt@gmail.com

Abstract

Periodontal and endodontic infections are interrelated and most common during routine dental practice. Palatogingival groove, a morphological anomaly usually reported on the palatal aspect of maxillary incisors, cause periodontal attachment loss and alveolar bone destruction and finally tooth loss. Unknown etiology was reported for the developmental defect, develops in to pathological condition only when the there is a discontinuity in the epithelial attachment. Early diagnosis and proper selection of therapeutic modalities helps in preservation of involved tooth. Milder cases were treated by saucerization, odontoplasty and strict oral hygiene maintenance protocol. Moderate case was treated by open flap debridement, regenerative applications such as bone graft and membrane placement. PGG restored using various restorative material and seal the morphology. Clinical diagnosis become unnoticed in most cases, hence proper diagnosis and therapeutic interventions are of prime importance in PGG management.

Keywords: Hertwig's Epithelial Root Sheath, Interruption Groove, Para-pulpal Line, Saucerization

1. Introduction

Palatogingival groove is a morphological anomaly usually found on the palatal aspect of maxillary incisors. The groove is a developmental defect not a pathology in most cases, becomes problematic when the epithelial attachment continuity is breached. Oehlers in 1958, first described radicular invagination in upper lateral incisor[1]. Prichard 1965, mentioned PGG predispose to localized periodontal disease[2]. Lee *et al.* reported a relationship between PGG and periodontal disease[3]. Withers in 1981, reported 2.33% prevalence rate for PGG of which 0.28% seen on maxillary central incisor, 4.40% seen in maxillary lateral incisor, 0.75% bilateral presentation[4]. Goon *et al.*, 1991, Kozlousky *et al.*, 1988 found groove on the facial aspect of the root[5]. On a single tooth, groove may occur either on the facial and lingual surface (or) simultaneously on both sides. Various terminologies given in literature are Radicular Anomaly, Distolingual groove, Radicular lingual groove, Palatoradicular groove, Cinguloradicular groove, Syndesmocorono-radicular tooth, Palatogingival groove, Interruption groove[6–8]. Various scientists have classified palatoginigival groove based on location and extent (Table 1).

Etiology is unclear, now evident that defect in the inner enamel epithelium and hertwigs epithelial root sheath leads to formation of PGG[9]. PGG acts as nidus for plaque deposit and bacterial growth. Inflammation begins with bleeding on probing followed by increased probing pocket depth, clinical attachment loss and radiographic bone loss[10]. Pulpal necrosis and vitality are lost in most cases. Clinical presentation varies from bleeding gums, severe pain, abscess, deep pockets, vertical bone loss, diastema. In periapical radiograph, groove is visible as a dark line extending along or superimposed or parallel to the root canal, termed as parapulpal line[11]. To visualize the presence of radiolucent parapulpal line, a second radiograph is taken at different angled position[12]. Histologically on Zeiss stereomicroscope it appears funnel like morphologic feature, rupture of CEJ is noted at the point of origin of groove[13,14].

PGG is a local contributing factor for periodontal and endodontic lesions, if undiagnosed it will lead to a very questionable prognosis. Treatment options include correction of the contributing factor and treating the resultant pathology or associated defect[15]. Diagnosis is not always easy; notch may be hidden below the gingival margin. PGG has to be properly diagnosed and

continuous alertness is noted in maxillary anterior region, as anomalies are most commonly reported there.

2. Case Report

A 48 years old male patient reported to the Department of Periodontology with a chief complaint of pain and swelling in the upper front tooth region for the past two months. On clinical examination, gingiva in relation to Tooth 12 was found to be inflamed (Figure 1a). Extrinsic stains and debris were noted. Periodontal examination revealed bleeding on probing with a probing pocket depth ranging between 12 to 14 mm in the mesial aspect of tooth 12 and 4-5 mm in the distal aspect of tooth 12 and 8mm in the palatal aspect (Figure 1b). Grade II mobility was noted. Patient gave a history of similar episode of pain in relation to Tooth 12 six months back. There was no significant history of trauma and the tooth was devoid of any carious lesion. Electric pulp testing showed vital response in relation to Tooth 12. Radiographic examination revealed

Table 1. Classification of Palato-gingival groove based on location and extent

1. Goon *et al.* classification	
a. Simple - Does not communicate with the pulp and represent a partial unfolding of Hertwig's epithelial root sheath. b. Complex - Characterized by direct communication with the pulp and grooves that extend the length of the root. c. Accessory root - Characterized by accessory roots.	
2. Kogan S.L 1986, classification	
By Location	• Mesial
	• Distal
	• Midpalatal
By Origin	• Lingual fossa
	• Cingulum
	• Cementoenamel junction
3. Gu *et al.*[16]	
a. Type 1 - grooves extending apically not beyond the coronal third of the root, tooth with a normal root configuration. b. Type 2 - grooves extending beyond the coronal third of the root, tooth with a normal or simple root canal c. Type 3 - Grooves extending beyond the coronal third of the root, tooth with a complex root canal system	
4. Based on termination of groove on the root[7]	
Lateral Incisor	• 43% crossed CEJ extended 1-5 mm on root
	• 47% crossed CEJ extended 6-10mm on root
	• 10% crossed CEJ extended >10 mm
Central Incisor	• 39% crossed CEJ extended 1-5 mm on root
	• 37% crossed CEJ extended 6-10mm on root
	• 24% crossed CEJ extended >10 mm
Root Depth	• Shallow <1 mm
	• Deep >1mm
	• Closed tube formed like tunnel - like channel

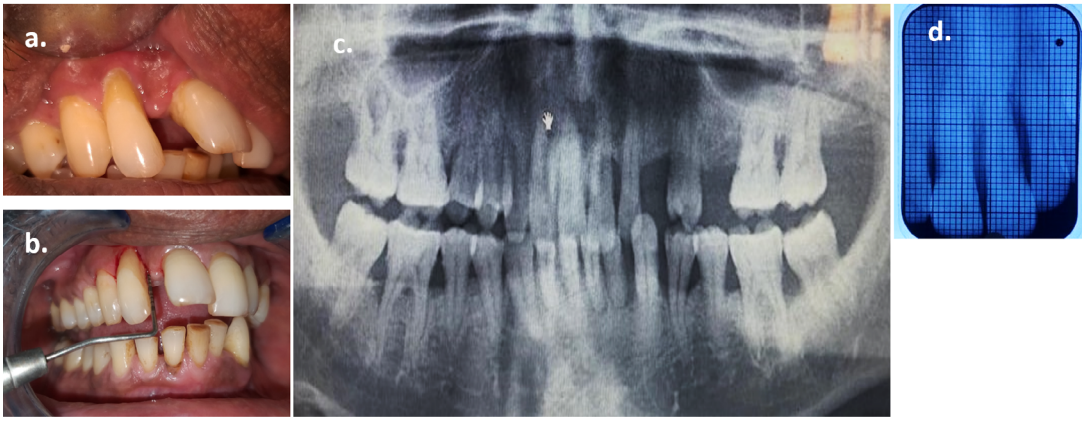


Figure 1. a. Preoperative image showing pus 12 discharge in 12, pathological migration in 11 and gingival recession evident in 12; b. On intraoral examination lateral incisor reveals probing pocket depth of 12mm on the mesial aspect; c. OPG reveals severe bone loss, in relation to 12, 11, 21, 22 and generalized radiographic bone loss; d. Periapical radiograph taken along with grid placement reveals bone loss up to middle third of root in 11,12,21.

extensive bone loss around it (Figures 1c and 1d). The case was diagnosed with localized chronic periodontitis in relation to tooth 12.

3. Treatment Method

The treatment was done in three phases. Initially emergency phase was started and the patient was relieved from pain by giving analgesics and reviewed after three days. The records of the patient were documented and the patient was advised to undergo routine blood investigation. Patient was advised to take orthopantogram and intra oral radiograph of tooth 12 region. Patient was then referred to department of endodontics to assess the vitality status by electric pulp testing and found to be vital. Complete scaling was done to remove the debris. The patient was recalled after 2 weeks. Test dose of local anesthetic was given and no allergic reactions were elicited. Under local anesthesia, scaling and root planning was done and patient was recalled after 6 weeks. There was reduction in inflammation and probing pocket depth was reduced by 2mm in relation to tooth 12. Overall oral hygiene status appeared satisfactory. Presurgical preparative phase was completed. Complete extra oral and intra oral disinfection was done using betadine. One hour before surgery, patient was advised to take 500mg amoxicillin. Under LA (lignocaine 2% with epinephrine 1:80,000), full thickness mucoperiosteal flap was elevated. On reflection, palatogingival groove was seen on the palatal aspect of root of tooth 12 extending from cementoenamel junction to apical third of the root, which was not visible clinically, followed by curettage (Figure 2). Depth of the groove ranges 6 to 8 mm. The debridement was done to remove the granulation tissue with the help of Gracey curette. The groove was checked for any irregularity and then treated by chemical conditioning with 10% polyacrylic acid for 20 seconds and restored with type II conventional glass ionomer. Strict isolation and dry area were maintained during the procedure. Flap was approximated to the original site and suturing was done. Periodontal dressing was placed. Post-surgical instructions were given. Patient was advised to maintain good oral hygiene, and mouth rinse (chlorhexidine 0.12%) was prescribed once daily for two weeks.

4. Post Operative Phase

The patient was recalled after 7 days and was found to be asymptomatic. Sutures and periodontal dressing were removed. Recall after 3 months showed reduction in pocket depth to 5 mm and reduction in mobility from grade II to grade I. Patient was kept under maintenance phase and recalled every 3 months.

5. Discussion

Various articles and literature have described about the PGG and their clinical significance. Defects usually present on the palatal surface, may also found on the mesial or distal region of incisors. Length of the groove

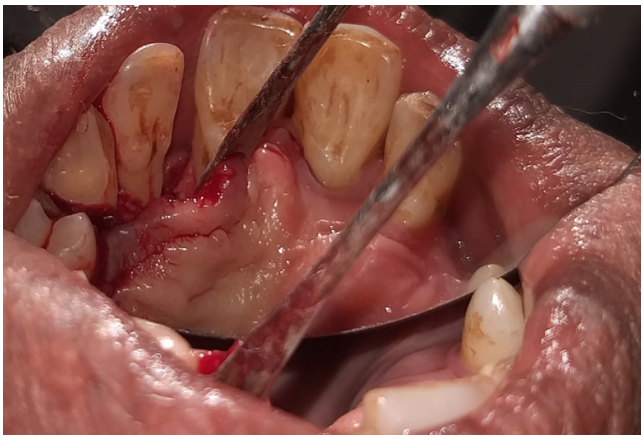


Figure 2. Palatoradicular groove was seen on the palatal aspect of 12, extending from cingulum to the middle third of the root, on flap elevation.

varies; it may start from the cingulum it reaches up to apical third of the root. PGG accelerate pulpal and periodontal problem in a silent way and lead to unfavorable sequalae and tooth loss.

In the case reported, palatogingival groove was found to be simple and moderate (Goon *et al.*) in midpalatal region, type 2 (Gu YG 2011). Though the case reported with grade two mobility, extraction was not planned because tooth was in the maxillary anterior esthetic zone. Way back, in the cases reported, PGG was managed by both endodontical and periodontal therapy[17] as perio and endodontic lesion are combined mostly. In this case where only periodontal lesion is found and pulp was vital according to endodontic opinion. In our case Palatogingival groove was found to be simple and moderate, PGG was thoroughly debrided and restored using GIC to enhance epithelial and connective tissue attachment, as Glass ionomer cement provide better seal and periodontal maintenance therapy was planned in future. However, one should rule out the possibility of pulpal necrosis for successful treatment outcome.

6. Treatment Methods

For simple/shallow grooves, saucerization or odontoplasty is the most commonly discussed treatment modalities[18]. In case of moderate palatoradicular groove, surgical intervention is required. Several treatment strategies for the correction of palatogingival groove are followed. Endodontic treatment followed by open flap debridement coupled with restoration of the coronoradicular groove with Biodentine proved successful[19]. Bone graft, Osteogen bioactive resorbable calcium apatite graft was placed in the area of vertical bone defect[20]. Glass ionomer cement was chosen as adhesion to the dentin is better and it also enhances epithelial and connective tissue attachment[21]. Glass-ionomer cement which provides excellent seal and favorable environment for fibroblast attachment was chosen to seal palatogingival groove[22]. In other case, defect was filled with bone graft (bioactive ceramic composite granules with 50% bioactive glass and 50% synthetic hydroxyapatite) followed by Guided tissue regeneration procedure using resorbable barrier membrane (periocol) was carried out[23]. Combined approach is followed in most cases[24]. In poor prognosis, extraction of the involved tooth is advised. The prognosis mainly depends upon the depth of the severity and involvement of pulp and most importantly maintenance therapy.

7. Conclusion

Palatogingival groove is a tooth related malformation and simply constitutes a periodontal hazard. Clinically identifying a groove is a challenging task for practitioners. The anomaly generally has a funnel- like shape, which forms a niche where bacterial plaque and calculus accumulate, and it is a predisposing factor for the onset of inflammatory process.

This mild morphological defect in dental structure makes it difficult and sometimes impossible, for the patient or even the professional to clean properly. If undetected or untreated, leads to attachment loss and endodontic lesion. Early detection of this anomaly during routine dental examination is the key to prevention of future periodontal and endodontic lesion.

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