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Management of various types of Palatogingival Groove

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ABSTRACT
As the name implies,palatogingival groove starts near the cingulum of the tooth and runs towards the cementoenamel junction in an apical direction at various depths and distances. The maxillary lateral incisor (LI) is most commonly (93.8%) affected tooth.In most cases, palatogingival groove results in a periodontal lesion that is interpreted as a consequence of pulp necrosis, which leads many professionalsto limit treatment to the root canal.Theclassic signs of palatogingival groove are infrabony periodontal pockets, tooth mobility,and recurrent abscesses.Recognition of such a defect is critical and important, especially because of its diagnostic complexity and its further consequences.This case report encompasses the management of different stages of palatogingival groove.

Keywords: Nonsurgical management, Hertwig epithelial root sheath, palatogingival groove, radicular lingual groove .

I. INTRODUCTION:

Morphological defects occurring in teeth can be predisposing factors for the onset of inflammatory processes in the periodontal and/or pulpal tissues. Palatogingival groove is one such defect, most frequently found on the palatal surface of maxillary laterals. Recognition of such a defect is critical and important, especially because of its diagnostic complexity and its further consequences[1].It occurs as developmental infoldings of the inner enamel epithelium and Hertwig's epithelial root sheath (HERS)which represents an aborted attempt to form an additional root[2]. It has a funnel shaped appearance which forms a niche for bacterial plaque and calculus accumulation.Inflammation may thus develop in the periodontal tissue adjacent to the groove leading to the detachment of junctional epithelium, periodontal destruction, pocket formation and alveolar bone loss[3]. The attachment may be breached due to endodontic involvement. Inflammation can progress from an apical lesion coronally along the groove, causing a primary endodontic/secondary periodontic lesion. If inflammation spreads to the pulp through defects in the groove or involvement of apex, a primary periodontic/secondary endodontic lesion develops[4]. Diagnosis and treatment of palatogingival groove is often dilemmatic and clinically challenging especially when the clinical presentation increases in severity and turns complex. Classification of palatogingival groove by Goon et al is given in table 1.[6]Early identification of this anomaly is highly recommended to prevent extensive involvement in future and enable efficient management of the consequences arising due to the defect. If the groove is entirely located on the crown-therapeutic options includes curettage of the affected tissues, saucerization of the groove with a round bur,sealing the groove with a variety of materials-e.g., composite, glass-ionomer cement etc.If the groove extends beyond the middle-third of the root surgical procedures are often required in an attempt to achieve new attachment[5]. This case series discusses with the diagnosisandmanagementof different stages of palatogingival groove .In case I palatogingival groove leadto retrograde pulpitis after periodontalbreakdowntreated with conventional RCT and saucerization and sealing of the groove , case II with mild palatogingival groove treated prophylactically with flowable composite and case III with complex palatogingival groove that has lead to severe bone destruction which ultimately lead to extraction of the tooth.

II. CASE REPORT

Case I

An 18 year old female patient reported to the department of Conservative dentistry and endodontics, Dayananda sagar college of dental sciences, Bangalore, with the chief complaint of purulent discharge and swelling from gums in relation to upper right front tooth (12) for last 2 weeks. Examination showed localized swelling and an intraoral draining sinus pointing on the labial gingiva between the left lateral incisor and canine (Fig. Ia). There was no history of trauma, caries, nor was there any discoloration of the tooth. The palatal surface of lateral incisor showed opening of palatogingival groove in relation to 12 and 22 (Fig. Ib). Periodontal examination revealed firm attached gingiva with absence of pockets as well bleeding on probing.There was grade III mobility in relation

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to 22 and Grade I mobility in relation to 12. Radiographic interpretation shows a teardrop-shaped radiolucency in both the laterals giving suspicion of palatogingival groove, which was later discovered and treated non surgically.(Fig 1c).CBCT showed periapical lesion with thinning of labial cortical plate in relation to 12 and diffuse periapical hypodense lesion perforating buccal cortical plate in relation to 22 and a palatogingival groove extending below CEJ(Fig 1d). On thermal and electric pulp testing, the associated tooth was found to be non-vital. Adjacent teeth elicited normal response. Findings were suggestive of retrograde pulpitis secondary to periodontal lesion.Diagnosis was Chronic periapical abcess i.r.t 12, Chronic periapical abcess with loss of labial cortical plate i.r.t 22,Palatogingival groove moderate type i.r.t 12 &22.Overall hygiene status of the patient appeared satisfactory. Further, on periodontal probing, a 3 mm pocket could be probed on the mid palatal aspect of the root i.r.t 22.

Emergency access opening was done ,pus drained,pulp extripated and irrigation done with 3%NaOCl.Working length determined with apex locator and confirmed with a radiograph.Canals were cleaned and shaped with k files using step back

technique.Copious irrigation with 3 %NaOCl was done at every step of instrumentation.Canals were dried using paper points following which CaOH paste was placed as intracanal medicament and access was sealed with IRM. In the second appointment ,there was no pus drainage and sinus has healed.Canals were obturated with cold lateral compaction of gutta-percha and zinc oxide eugenol sealer.(fig I e)At 6 months, gingiva appeared healthy and probing depth further reduced to 2 mm which continued to remain at the same level even at 12 months. Radiograph after 1 year(fig 1 f) showed excellent healing in the periradicular area i.r.t 12 and 22.

Case 2

A 17 year old male patient reported to the department of Conservative dentistry and endodontics, Dayananda Sagar college of dental sciences, Bangalore, with the chief complaint of sensitivity to cold in relation to upper front teeth.Extraoral examination revealed no significant findings.Intraoral examination revealed deep anatomic pits on palatal surface of 12 and 22.(fig 2a).The teeth were not tender on vertical percussionand responded normally to thermal and electric pulp testing.IOPAR revealed a groove in relation to 22 and no periapical changes were seen with both the teeth. (fig 2b)A cbct was taken to know the extend of the groove and has shown the groove extending from cingulum to the level of CEJ(fig2c).The diagnosis was given as mild form of palatogingival groove.

Prophylactic sealing was done with flowable composites i.r.t both the teeth(fig 2 d).The patient remained asymptomatic when he reported 1 week after treatment and continues to be under follow up.

Case 3

A 45 year old female patient reported to the department of Conservative dentistry and endodontics, Dayananda sagar college of dental sciences, Bangalore, with the chief complaint of pain in relation to upper front teeth.Extraoral examination revealed no significant findings.Intraoral examination revealed deep anatomic pits on palatal surface of 12 .(fig 3a).The tooth gave no response to both thermal and electric pulp testing and showed grade III mobility.IOPAR revealed a groove extending from the cingulm to below the middle third of the root . The groove was associated with severe periodontal breakdown and extensive periapical lesion(fig 3b).There was severe bone loss with respect to the same .The diagnosis put forward was complex form of palatogingival groove .Due to poor prognosis the tooth was extracted. PPG was confirmed only after the tooth was extracted and observed under a dental operating microscope (3 c).

III. DISCUSSION

Goon et al. have classified palatogingival grooves as mild ,moderate and complex.Mild grooves are less likely to cause severe destruction as they do not communicate with the pulp and represent only a minor infolding of the Hertwig's epithelial root sheath. On the contrary, complicated grooves communicate with the pulp cavity either laterally or apically owing to their severe depth and extent on the root. They are more likely to precipitate complex endo-perio lesions[6] .

Due to the abnormal anatomical configuration, the palatogingival groove poses technical difficulties in its clinical management. Radicular groove can create periodontal and pulpal pathology, but they may be difficult to identify as an etiological factor.In case 1 there was pulpal involvement for which root canal treatment was done in relation to to 12 and 22. Recognizing RLGs as the initiator of pathology can often be difficult, patient may present with pulpal involvement in teeth that have no caries or history of trauma [7].In case 1 Endodontic treatment was done as the tooth had become nonvital due to the chronic long-

standing involvement of the periodontium because of the presence of communicating channels between the groove and the pulp chamber, which facilitated bacterial penetration, causing the pulp tissue to undergo inflammation, degenerative changes, and eventual pulp necrosis.

When no visible communication exists between the groove and the pulp cavity, treating the groove as a separate entity and preserving the vitality of the pulp is a recommended treatment approach which is followed in case 2 where the defect is filled with flowable composite.[8].

The problem encountered in the management of a tooth that presents with a palatal groove relates to the inability to adequately treat the tooth periodontium and resolve the associated localized periodontal defect. It is important to note that it is the ability to adequately treat the associated periodontal defect that ultimately determines the prognosis of these teeth. Delayed diagnosis decreases the prognosis of the tooth and could result in the extraction of the tooth as in case 3.

In a case report,a patient with a maxillary lateral incisor with a deep palatogingival groove extending to the root apex and severe periodontal destruction was presented. Suggested treatment modalities included curettage of the affected tissues, elimination of the groove by grinding and/or sealing with a variety of filling materials, and surgical procedures. In this case, a combined treatment approach, involving both endodontic therapy and intentional replantation after restoration with a self-etching flowable composite, resulted in periodontal healing and significant healing of the periradicular radiolucency at 12 months. In short, intentional replantation offers a predictable procedure and should be considered a viable treatment modality for the management of palatogingival grooves, especially for single-rooted teeth[10].

When a palatal groove is present, diagnosing a pulpal or localized periodontal lesion can sometimes pose a dilemma for the general dentist because these radicular grooves act as 'funnels' aiding microbial plaque accumulation, leading to gingivitis, localized periodontitis and even pulpal necrosis. Also it demonstrates signs and symptoms similar to other clinical conditions like vertical root fracture, dens invaginatus etc[9] .However, when a timely diagnosis is made, there are recognized ways to manage the situation and, in many cases, the involved tooth or teeth can be saved. Thorough examination of the morphological anomalies associated with the lateral and central incisors, aided by appropriate diagnostic aids like transillumination, perio probing, bite test, surgical visualization of the site, cone beam computed tomography etccan lead to accurate diagnosis and proper management of the condition [11].

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CASE I

Fig 1a: Sinus opening with respect to 12.

Fig 1b :palatal surface of lateral incisor showed opening of palatogingival groove

Fig 1c:Pus drainage in relation to 12

Fig 1d:intra oral periapical (IOPA) radiograph showing peri apical radiolucency .

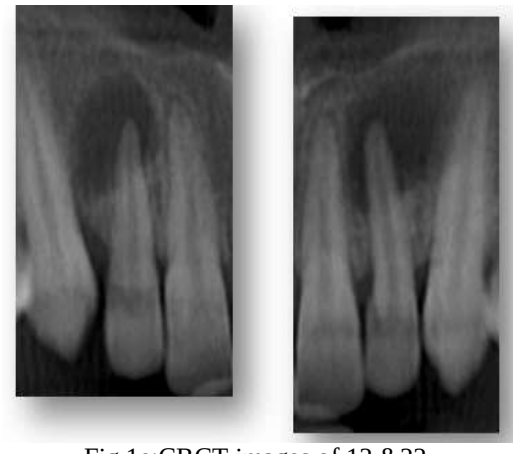

Fig 1e:CBCT images of 12 &22

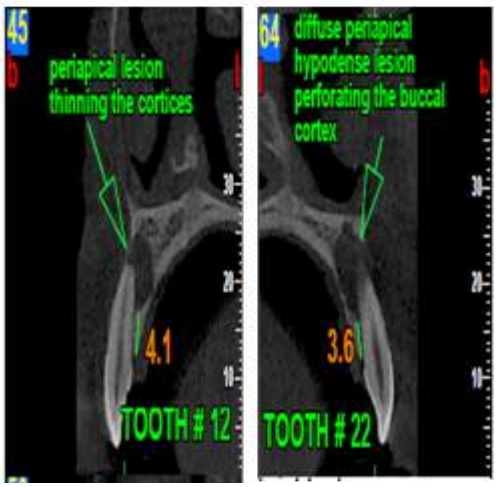

Fig 1f:RCT in relation to 12 &22.

Fig 1 e-1 year follow up

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Table 1

Classification of radicular groove by goon et al

Mild	Gentle depressions of the coronal enamel, which terminate at or immediately after crossing the cemento-enamel junction
Moderate	Continue to extend some distance apically along the root surface in the form of a shallow or fissured defect
Complex	Deeply invaginated defects that involve the entire length of the root or that separate an accessory root from the main root trunk

CASE II

Fig 2a:Palatal view 12&22

Fig 2b: IOPARin relation to 22 showing the palatogingival groove.

Fig 2c cbct -Axial section above the CEJ showing the groove.

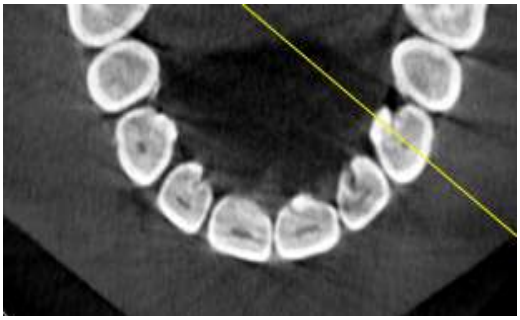

Fig 2d:Palatogingival groove restored with flowable composite i.r.t 12 &22

CASE 3

Fig 3a:Palatal view showing palatogingival groove in relation to 12.

Fig 3b: IOPAR in relation to 12

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Fig 3c:Palatal aspect of the extracted tooth, showing deep palatogingivalgroove