Palatogingival Groove -The Hidden Predator

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ABSTRACT:

The radicular lingual grooves act as a nidus for plaque accumulation which destroys the sulcular epithelium and the periodontium, resulting in the formation of a localized periodontal lesion. If inflammation spreads to the pulp through defects in the groove, a primary periodontic/secondary endodontic lesion develops. Successful treatment of the groove depends on the ability to eradicate inflammatory irritants, by eliminating the groove and managing the associated periodontal defect. This is a case report of an incisor with a palatogingival groove associated with an infrabony defect and its successful management using an interdisciplinary approach.

Key words: bone graft, glass ionomer cement, palatogingival groove.

Introduction

Dental anomalies are the developmental defects or deformities which are often unnoticed in diagnosis. The developmental anomalies that represent an infolding of the enamel organ and the epithelial sheath of Hertwig are known by various names namely the palatogingival grooves, radicular lingual grooves, palatal radicular grooves, radicular palatal grooves, distolingual grooves or radicular gingival grooves.¹ Kovacs (1971) called this anomaly 'syndesmocorono-radicular tooth'. In a morphological analysis of these grooves, Ennes and Lara suggested that the palatal groove could be the result of an alteration of genetic mechanisms, rather than an enamel organ folding.²

The groove made its first identity in dental anatomy text in 1917 and was later described by Zeisz Nuckolin (1949). In 1958, Oehlers described a radicular invagination of an upper lateral incisor in a Chinese female.^{3,4} In 1965, Prichard explained this as a defect predisposed to the formation of periodontal pockets.⁵ Later Lee et al formulated the term "groove" which was not used in dental literature until then, while presenting a case report concerning palatal grooves in maxillary laterals.⁶

The palatogingival groove can be found in various locations of the tooth viz. cingulum, followed by lateral fossa, cemento-enamel junction and root in decreasing order, most commonly located in the midpalatal area followed by distal and then mesial.⁷ It can start from the cingulum and proceed apically along the root for a variable distance, providing a plaque-retentive area which is difficult to instrument.²

The presence of this groove does not always indicate the development of pathology. In most cases the epithelial attachment remains intact and only when this attachment is breached, a self-containing pocket forms along the length of the groove favouring microbial plaque retention leading to the destruction of sulcular epithelium and later deeper parts of the periodontium. This results in a severe localized periodontal lesion since proper cleaning of that site is difficult, if not impossible, for the patient.^{1, 8} If inflammation spreads to the pulp through defects in the groove or involvement of apex, a primary periodontic/secondary endodontic lesion develops.⁸

The prognosis of pulpal disease and/or periapical inflammation in the presence of palatogingival groove is not very favourable and depends on the extension, depth and its relation to the pulp cavity.⁹ The ability to eradicate inflammatory irritants, by eliminating the groove using different treatment modalities defines the success rate of the treatment.¹⁰

Case Report

A 36-year-old male patient reported to the Department of Periodontology, Institute of Dental Studies & Technologies, Modinagar, UP, with a chief complaint of pus discharge and mobility from right upper front tooth since 2-3 months. There was no history of trauma, caries and discoloration of the tooth. On clinical examination, a localized gingival inflammation was present with soft edematous tissue and a groove running from the cingulum towards the root was found on the palatal aspect. Periodontal examination revealed bleeding on probing and periodontal pocket of 10mm on the distopalatal aspect of the lateral incisor along with grade I mobility. On radiographic examination, an extensive localized bone loss was present associated with the lateral incisor (Figure 1). Based on the clinical and radiographic findings a diagnosis of a perio-endo lesion was made. A decision to endodontically treat the tooth followed by

periodontal surgery was taken and explained to the patient.

The tooth was isolated prior to access preparation and determination of working length. Cleaning and shaping of the canal was done using K- files followed by the placement of an intracanal medicament (Metapex) for a period of 3 weeks. The canal was obturated with lateral condensation of gutta-percha and zinc oxide eugenol sealer. After completion of the root canal and curettage of deep periodontal pocket, surgery was planned.

After complete extraoral and intraoral mouth disinfection with betadine, local anesthesia was administered (xylocaine 2% with epinephrine 1:80,000). A crevicular incision was given and a full thickness mucoperiosteal flap was elevated on the facial and palatal aspects (Figure 2 and 3). After flap reflection, the defect was debrided and thoroughly cleaned which made the groove visible. Thorough scaling and root planing was performed over the groove followed by its restoration with glass ionomer cement. The defect was filled with porous hydroxyapatite bone graft (Biograft HA®) (Figure 4). The flap was repositioned and sutures followed by a periodontal pack were placed. Post operative instructions were given and the patient was recalled after two weeks for the removal of pack and sutures. The patient was put on maintenance therapy initially and a radiograph was taken at the end of four months. The probing pocket depth reduced from 10mm to 5mm at the end of four months (Figure 5).

Discussion

Palatogingival groove is a contributing factor and a rare developmental channel of communication between the pulp and the periodontium that has proven to be a challenge to dentists.¹⁰ The region in which the lateral incisors are located is considered to be an area of embryological risk, where a number of malformations occur. These developmental anomalies are very often missed while diagnosing of localized periodontal pathology.¹⁰ After an examination of 3168 extracted incisors, Kogon reported the prevalence of the palatogingival groove to be 3.4% in central incisors and 5.6% in lateral incisors.⁷ About half of these grooves (54%) extended onto the root surface; of those, 43% extended less than 5 mm, 47% 6 to 10mm and 10% more than 10mm apically from the cemento-enamel junction. In the present case it was present starting from the cingulum till the apical third of the root.

Figure 1: Preoperative clinical and radiographic findings associated with the lateral incisor

Figure 2: Flap reflection (buccal view)

Figure 3: Flap reflection (palatal view)

Figure 4: Correction of the groove and placement of bonegraft in the defect

Figure 5: Postoperative clinical and radiographic result

Diagnosis of the radicolingual groove as the initiator of pathology is very important especially in the cases where a patient may present with pulpal involvement in teeth that have no relevant history or clinical finding or history of trauma¹¹, similar to the one present in the present case. Lee⁶ reported a positive association between palatogingival groove and localized periodontitis.⁶ Clinically, grooved teeth have demonstrated significantly higher plaque, gingival and periodontal disease index scores than non-grooved incisors. Accessory canals connecting to the pulp in the depth of the grooves which may lead to bacterial ingress to the pulp space have been reported.¹² Similarly, the extension of the groove to the apex, could have contributed to the apical pathosis.

Various modalities have been implicated for the treatment of the palatogingival groove ranging from odontoplasty and saucerization to filling the groove with restorative materials such as glass ionomer cement, composite and amalgam (Brunsvold 1985, Friedman & Goultschin 1988).¹³ Glass ionomer cement has been used in this case as it has an antibacterial effect, chemical adhesion to the tooth structure and good sealing ability (Maldonado et al 1978¹⁴, Vermeersch et al 2005¹⁵). Clinical and histological studies have shown that there is an epithelial and connective tissue adherence to the glass ionomer cement during the healing process.¹⁶ The intra osseous defect, if present can be grafted with bone fillers. Since there was an advanced circumferential bony defect, a hydroxyapatite bone graft was placed to promote bone regeneration. In the present case clinical success might be attributed to elimination of the local factor for supragingival and subgingival plaque accumulation by filling the groove with a restorative material and treating the osseous defect with bone filler.

Conclusion

The palatogingival groove is a rare but potential problematic area, which should be evaluated and treated accordingly. The groove can lead to combined endodontic periodontal lesions, which are difficult to deal with and therefore attention has been brought to its presence and clinical significance. Either the endodontic lesion or the periodontic lesion can be preliminary in the combined lesion, which is difficult to differentiate in clinical practice. Therefore, most of the combined lesions may successfully be treated with an interdisciplinary approach.

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