

Palatogingival Groove – An Added Dimension in the Etiology of Localised Periodontitis

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Abstract Purpose: Developmental radicular anomalies include the palatogingival groove, the distolingual groove and the radicular groove. Developmental infoldings may result in defects that can provide a pathway for pulpal pathology, and consequently periodontal destruction. Various studies have shown different treatment approaches for this developmental anomaly. In this case report, we aimed to clinically evaluate the sequelae of palatogingival groove and its clinical management effectively. **Methods:** A 27-year old male patient attended the outpatient department of Periodontics, Ragas Dental College & Hospital, Uthandi, Chennai, South India with a complaint of dull gnawing pain in the left maxillary central incisor region for the past six months. Clinical examination confirmed the presence of palatogingival groove on tooth no. 22. An interdisciplinary treatment with endodontic and periodontal management was opted. After completion of root canal treatment, flap was raised in 22 region and the unique semilunar bone defect near the apex of the tooth was debrided, bone graft place and flap sutured. The patient was recalled after one, three and six month interval. **Results:** The combined treatment approach was successful and the tooth was saved from further deterioration. **Conclusion:** Early detection of this developmental anomaly is essential to preserve the life of the tooth for both functional and esthetic purpose.

Keywords: tooth abnormalities, palatogingival / palatoradicular groove, localised periodontal disease, therapy outcome

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1. Introduction

Abundant evidence implicates microorganisms as the primary and most common aetiologic factor in various forms of periodontal disease [1,2]. However, there are numerous local conditions such as palatogingival grooves that favour the accumulation of plaque apical to or near the gingival margin, which contribute to the progress of chronic inflammatory periodontal disease (CIPD) [3,4,5,6]. Early recognition of these factors is essential to prevent/minimise periodontal disease and the resulting destruction.

Anatomic variations or anomalies of tooth morphology may predispose to CIPD, influencing treatment and maintenance. There are numerous morphologic anomalies that contribute to localised tissue destruction namely cervical projections, enamel pearls, buccal grooves and palatogingival / palatoradicular grooves to name a few [7,8,9]. Of these, one variant that has received little attention is the palatogingival / palatoradicular groove. These developmental infoldings of the inner enamel epithelium and Hertwig's epithelial root sheath (HERS), may result in defects that can pave the way to pulpal and concurrent periodontal pathology. The prevalence of these grooves is maximal in the maxillary lateral incisors, many

a time jeopardising treatment and ultimately aesthetics [10,11,12].

The tube-like channel serves as an ideal locus for plaque and calculus accumulation, thus acting as a secondary local etiologic factor, encouraging the development of periodontal disease. Generally, these grooves begin in the central fossa which cross the cingulum and extend for various distances and directions along the length of the root. In rare instances, these grooves present a diagnostic and treatment dilemma. The few references in dental literature dealing with this anomaly trace the relationship of these defects to severe, localized and often hopeless periodontal disease [13,14]. Koracs (1971) [15] called it as "syndesmocoronaradicular tooth," endowing the groove with great significance, especially its alteration at the level of the cemento-enamel junction where the grooves passes from the crown to the root.

Lee et al (1968) [16] was the first to report an association between palatoradicular grooves and localized periodontitis. They described eleven cases where unilateral and bilateral defects in lateral incisors were associated with moderate / severe periodontal disease. The purpose of this case report is to highlight the pivotal role played by the palatogingival / palatoradicular groove in

the causation of localized periodontal disease with an attempt to assess the outcome of selective surgical therapy.

2. Case Report

A 27 year old male patient who attended the outpatient department of Periodontics, Ragas Dental College & Hospital, Uthandi, Chennai, India, presented with complaints of moderate to deep gnawing pain in the maxillary anterior region (in relation to tooth # 22) for the preceding six months. Clinical examination revealed mobility (Grade I), probing depths of > 5 mm circumscribing the involved teeth with associated clinical attachment loss. Palatal examination revealed the presence of a palatogingival groove in relation to the tooth (Figure 1).



Figure 1. Palato gingival Groove in tooth #22

Radiographic examination revealed the presence of radiolucency in the periapical region which necessitated primary endodontic treatment, followed by open flap debridement. With an informed consent from the patient, under aseptic conditions, local anesthesia was administered and a full thickness mucoperiosteal flap was raised involving one tooth on either side of the defect for ease of access. The palatogingival groove, thus exposed, was seen to extend to the middle of the root and a semilunar shaped periapical defect of the bone was detected (Figure 2).



Figure 2. Extent of the Palato gingival Groove on the root



Figure 3. Semilunar shaped bone defect curretted and bone graft placed

The exposed area was thoroughly debrided using Gracey curettes. A demineralised freeze-dried bone xenograft (Bio Oss) was placed in the defect (Figure 3).

With the help of diamond burs, the groove on the radicular aspect was smoothed so that it blended well with the root surface, while its coronal extension was sealed using Glass Ionomer Cement [17]. The flap was then approximated using simple interrupted 3-0 black silk sutures. Patient was given postsurgical oral hygiene instructions. Antibiotics and non-steroidal anti-inflammatory drugs were prescribed and the patient was recalled after a week for suture removal. Clinical evaluation was done at 1, 3, 6 months and one year interval. Radiograph was taken after one year.

2.1. Result

There was improvement in the clinical signs such as decrease in CAL and mobility in tooth #21. Radiograph taken after six months showed evidence of bone regeneration in the periapical region.

3. Discussion

Palatogingival grooves have usually been described based on their location-Mesial, Distal and Midpalatal; Origin-(Lingual fossa, Cingulum, Cementoenamel junction or Root); and termination-(Cingulum, Cementoenamel junction or Root). Conformation of these grooves were usually designated as shallow (< 1mm), deep (> 1mm) or closed tube which formed a tunnel-like channel [18,19].

Although these grooves are of some curiosity to morphologists, they have an immediate concern to the dentist and his patient, as food debris, plaque and calculus may collect in the depths of groove, initiating gingivitis and eventually periodontitis [20,21]. Treatment depends on the extent, depth and direction of these grooves. Closed debridement coupled with odontoplasty should generally be successful for shallow defects that do not extend down the length of the root for any great distance. Jeng et al [22] in 1992 treated an osseous lesion associated with severe palatoradicular groove. However, open flap debridement becomes mandatory for deeper and more tortuous grooves. Deep grooves that terminate further down the root or on the lateral surface may indicate a poor or hopeless prognosis. Anderegg et al [23] have treated 10 cases of palatogingival groove involved periodontitis with open flap debridement and ePTFE membrane and has showed improved results. When restorative procedures such as crowns, are indicated on teeth with a palatogingival groove, care must be taken to assess the relationship of the groove to the margins of the preparation. Deep and extensive grooves tend to influence the outcome of therapy. If the operator considers it safe to proceed with a crown, due consideration must be given to the conformation of the groove. While shallow grooves pose no difficulty, deep depressions or closed tubes could result in very demanding, if not compromised restorative procedures. It may not be feasible to design and cement a casting that would seal this type of defect. Nevertheless, when the groove crosses the cemento enamel junction (CEJ), an alteration at the level of the junction occurs in about one-third of the cases. The operator should be aware

of this and hence thoroughly inspect that part of the preparation, so that, unsupported enamel fragments are not left behind.

Similar to other previous reports our case report also shows successful treatment of palatogingival grooves using endodontic treatment, radiculoplasty with round burs, open flap debridement and management of osseous defect with demineralised bone grafts. It is thus obvious that the practising dentist should be aware of such palatogingival/palatoradicular grooves and when detected, treat them adequately with an interdisciplinary approach so that they do not pave the way for the future tissue destruction and ultimately tooth loss.

4. Conclusion

Early detection and treatment of palatogingival grooves has been highlighted. Generally, a majority of these grooves terminate on the cingulum. Such grooves can act as tunnels, causing pulpal involvement and ensuing periodontal infection, paving the way for destruction of the deeper structures. Hence, it is mandatory that these grooves be detected early and treated accordingly so as to minimise the mortality of anterior teeth, the loss of which can jeopardize the patients' physical as well as mental well-being. Thus, it would be fitting to say that a meticulous examination by the dentist in detecting these grooves and concurrently treating them would go a long way in mitigating the unpleasant sequelae caused by palatogingival grooves.

Statement of Competing Interests

The authors have no competing interest.

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