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CASE REPORT

MANAGEMENT OF PALATOGINGIVAL GROOVE IN MAXILLARY INCISOR - A CASE REPORT AND REVIEW

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ABSTRACT

Palatogingival grooves (PGG) are developmental malformations which predispose to endo-perio lesions. Owing to their occurrence, funnel-shaped morphology and vacillating extent on tooth root, they advocate plaque and bacterial adherence to levels significant for the development of pathology. Several treatment approaches have been recognized in literature for the management of PGG. In this report, a 32 year old patient reported with the complaint of pain in maxillary left central incisor. Clinical examination confirmed an endo- perio lesion in relation to PGG. The aim of this case report is to provide treatment strategies for PGG which includes eradication of microbes, sealing the PGG to eliminate bacterial colonization and to regenerate the attachment apparatus. Combined endo - perio approach will be successful in resolving the pathology with complete healing clinically and radiographically. Prompt diagnosis, prevention and management is required to prevent tooth loss due to complications arising secondary to their presence.

KEYWORDS: Palatogingival groove, mineral tri-oxide aggregate, platelet rich fibrin.

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INTRODUCTION:

Palato-gingival groove(PGG) is defined as a developmental anomaly of the root that when present is usually found on the lingual surface of the maxillary incisor teeth(Lee KW et al,1968)[1].PGG originates when the central fossa crosses the cingulum and extends to varying distance in an apical direction (Withers JA et al,1981).Diverse occurrence rates for PGG have been reported[2]. Kongon et al, surveyed 3,168 extracted maxillary incisors and reported a prevalence rate of 4.6% total, and 5.6% in maxillary central inciors[5].

Several etiologies have been claimed for this developmental anomaly:

1. Consequence of an alteration in growth, such as an infolding of the inner enamel epithelium and epithelial sheath of hertwig (Lee KW et al,1968[1]).

2. Variant of dens invaginatus(Lee KW et al, 1968[1] and Withers JA et al,1981[2]). 3.Alteration of a genetic mechanism and attempt to form another root[3,4]. It has been claimed that irritants and microorganisms progress along the hollow, funnel-shaped PGG surface, advancing to the periodontal breakdown and root surface contamination resulting in retrogenic pulp necrosis even though PGGs do not reach the apex and are not very deep. The aim of this case report was to provide a diagnostic and treatment strategy for PGG which includes.

- Eradication of the microbes
- Sealing the radicular groove to eliminate bacterial colonization; and
- To regenerate the attachment apparatus.

CASE REPORT:

DIAGNOSIS AND TREATMENT PLANNING:

A 32 year old male patient who had a dull intermittent pain at the palatal side of the left maxillary central incisor for past 2 months came to the Out-patient Department Of Periodontics. On Clinical examination, the left maxillary central incisor (21), had an intact crown without caries or fracture, with a positive response to percussion (Fig 1). The tooth was grade II mobile with probing pocket depth of 8mm in the mesio-palatal aspect of the tooth with a concomitant finding of palatogingival groove extending into the gingival sulcus (Fig 2). Oral hygiene was satisfactory. An IOPA of 21 revealed widening of PDL space in the mesial aspect of the tooth extending upto the apical region. The patient was then referred to Department of Endodontics for testing vitality of pulp, which showed delayed response. A diagnosis of Type –II Palatogingival groove was made[6]. The patient was planned for a root canal therapy followed by periodontal management.

Fig 1- Frontal view showing absence of caries or crown fracture in relation to 21

Fig 2- Probing pocket depth of 8mm noted pre-operatively in relation to 21

ENDODONTIC MANAGEMENT:

A Phase I therapy, oral prophylaxis was performed. An endodontic access was performed

after disinfecting the area with 2% Chlorhexidine digluconate (Calypso,Septodent, India) and isolating with rubber dam. A working length was determined using an electronic apex locator .The root canal was cleaned and shaped using crown down technique along with rotary Ni-Ti ProTaper system along with Glyde (Dentsply Maillefer Company,USA). The tooth was copiously irrigated with 2.5% sodium hydrochloride, following which the access was temporized using calcium hydroxide. The patient was then recalled after 1 week, the tooth was asymptomatic and hence it was obturated using thermo-plasticized gutta percha obturating technique (Fig 3) with the appropriate master gutta-percha cone and AH-Plus sealer (Denstsply Maillefer Company, USA).

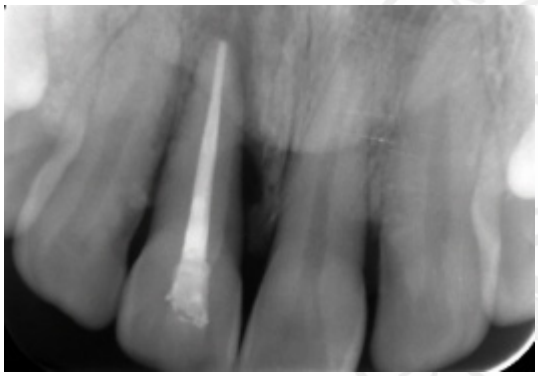

Fig 3- Pre-operative IOPA showing radiolucency on the mesial aspect of 21

PERIODONTAL MANAGEMENT:

Phase II/surgical therapy:

Patient was then recalled after 4 weeks for review and periodontal therapy[2]. On re-examination, decrease in mobility was noted from grade II to grade I. the patient was anaesthetized using local anaesthesia (2% lignocaine with epinephrine 1:80000).An envelope flap was raised from the buccal and palatal aspect (Fig 4) involving one-two teeth on either side and the PGG was isolated to its most apical extent (Fig 5). A thorough scaling and root planing was done over the groove and degranulation was done using Gracey Curette Number 1/2 and 11/12 (Hu-friedy Manifacturing Co,Chicago,IL) to leave the soft tissue more conducive for regeneration (Fig 6). Root conditioning was done using 1% tetracycline (Fig 7) and Mineral Tri-oxide Aggregate (Steptodont,St. Maur-des-Fossess,France) was applied into the defect (Fig 8). The area was kept isolated from blood and tissue fluids during the setting of the cement.

Defect closure with Bone Graft and PRF membrane: A 12ml sample of whole blood was drawn intravenously from the patients left ante-cubical vein and centrifuged (REMI Model R-8c with 12x 15ml swing out head) under 3000 rpm for 10mins to obtain the PRF (Fig 10).The bony defect was filled with De- mineralized freeze-dried bonegraft (Osseograft, Advanced Bio-Tech, India) (Fig 9). The compressed PRF membrane was the placed over the graft (Fig 11) and flap was approximated using 3-0 BBS sutures (Fig 12). Immediate post operative radiograph was taken to view the bone defect fill (Fig 13).

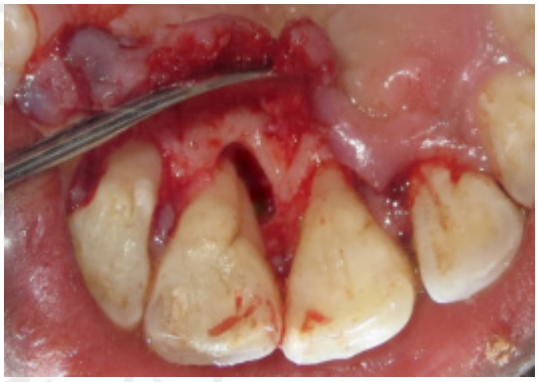

Fig 4- A full-thickness flap raised in relation to the palatal aspect of 21.

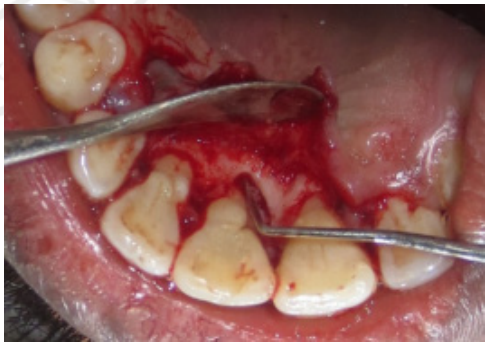

Fig 5- PGG noted after flap elevation in relation to the palatal aspect of 21.

Fig 6- Odontoplasty done using a round bur in relation to 21 palatal aspect.

Fig 7- Root conditioning done using tetracycline in relation to the palatal aspect of 21.

Fig 8- PGG sealed using MTA in relation to the palatal aspect of 21.

Fig 9- Xenograft placed in the bone defect in relation to the palatal aspect of 21.

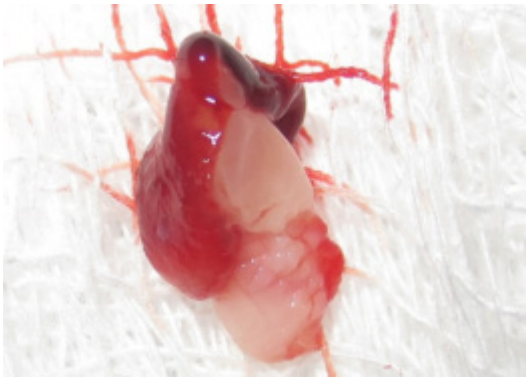

Fig 10- PRF procured

Fig 11- PRF placed in relation to the palatal aspect of 21.

Fig 12- 3-0 BBS sutures placed in relation to 21,. 22,23

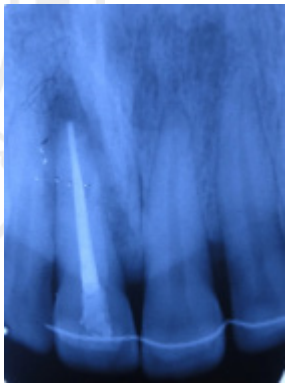

Fig 13-Immediate post-op IOPA in relation to 21.

POST-SURGICAL INSTRUCTIONS:

Following surgery, the patient was placed on amoxicillin 500 mg, thrice a day dosage for 5 day and Ibuprofen to relieve discomfort. In addition 0.12% Chlorhexidine gluconate rinse twice daily for two weeks, half an hour after brushing was prescribed. The patient was asymptomatic post-operatively and sutures were removed after 7 days. The patient was then recalled after 3 months and then 6 months; he showed improvement clinically and radiographically. Clinically there was a reduction in the pocket depth with 3mm non- bleeding sulcus at the end of 6

months (Fig 14). There was a significant reduction in radiolucency radiographically.

Fig 14- 6 months post-operative view in relation to the palatal aspect of 21.

DISCUSSION:

The PGG is a rare aberration on the maxillary anterior teeth, with a prevalence rate of 5.6% in the maxillary central incisors. PGG apparently renders a communication between the oral environment and pulp resulting in concomitant endodontic and periodontal pathology[9]. Understanding the anatomic complexities associated with the palato radicular groove is critical to the overall success of the treatment. In our case report the elimination of the groove was done by sealing with MTA and regeneration of the lost periodontal structures with the use of bone graft (Xenograft) and PRF.

ELIMINATION OF THE RADICULAR GROOVE:

Many materials have been used for eliminating the groove like Amalgam, Composite, Glass inomer Cement and emdogain. MTA(Mineral trioxide aggregate) is a bioactive, biocompatible, antibacterial material with good stability, and excellent sealing ability. High success rate for MTA also stimulates the production of cytokines in human osteoblasts, allows good adherence of the cells to the material, thereby playing an active role in dentin-bridge formation[7].

REGENERATION OF THE PERIODONTAL TISSUES:

The defect after de-granulation was filled with Demineralized freeze- dried bone graft (Osseograft, Advanced Bio-Tech, India) which has a osteoinductive property and was covered by a PRF membrane. The platelet rich fibrin membrane acts by releasing high-concentration growth factors (such as transforming growth factor type beta 1 (TGF-β1), platelet-derived growth factor (PDGF)-AB, vascular endothelium growth factor (VEGF)) and glycoproteins (such as thrombospondin-1) during at least 7days [Dohan Ehren fest DM et al, 2009][8] into the wound site, thereby stimulating healing and new bone formation (Choukroun J et al 2006) [10]. The use of platelet rich fibrin membrane is a simple cost effective method and also reduces the need for specialized grafting material. Because it is a completely autologous product, the risk of disease transmission and graft rejection is negated(Choukroun J et al 2006)[10].

The post-operative view showed a reduction in PPD and symptomatic relief for the patient clinically and radiographically reduction in the size of the radiolucency at the end of 6 months.

CONCLUSION:

PGG if left unattended may predispose the maxillary incisors to attachment loss. This case report involved a maxillary central incisor with a type II PGG associated with periodontal and pulpal involvement. The treatment outcomes that have been achieved in this case are clinical attachment gain (8 mm), no increase in gingival recession, and the disappearance of the periapical radiolucency, thus emphasizing the fact that complex interdisciplinary approach can have hope for teeth with poor prognosis.

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Nil

CONFLICTS OF INTEREST:

There are no conflicts of interest.

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