

Management of Mucosal Fenestration using Platelet Rich Fibrin Membrane Following Root Resection.

Abstract:

Mucosal fenestration associated with maxillary first molar is rare but challenging to treat when there is loss of marginal bone along with buccally oriented root angulation. The exposed root within the oral cavity along with large mucosal defect makes it susceptible to plaque accumulation and infection. This case report showcases the management of mucosal fenestration associated with mesiobuccal root of Left Maxillary first molar by root resection and Platelet rich fibrin membrane.

Key-words: Mucosal fenestration, Root resection, Platelet Rich Fibrin membrane.

Introduction:

Root surface, being denuded of bone and covered by periosteum is classical definition of Alveolar fenestration[1], although the phenomenon of alveolar fenestration along with loss of mucosa over the root tip in maxillary posterior tooth is rare. The root tip angulation and prominence and microbial biofilm formation on exposed root tip along with loss of buccal cortex plays an important role in prognosis and treatment planning[2]

Etiology for such defects might also be attributed to periapical abscess following either a primary endodontic or periodontal lesion in a tooth having thinner buccal cortical bone, orthodontic treatment, trauma, attrition and traumatic occlusion[3,4.]

Case History:

A 32 years old female patient presented with chief complaint of pain in the upper left posterior teeth region along with history of bleeding while brushing

On clinical examination, maxillary left first molar had a deep occlusal caries and was tender to vertical percussion. Clinically, there was RT1 gingival recession on the buccal surface and a wide mucosal fenestration measuring about 4mm exposing the apical one-third of mesiobuccal root (Figure 1). No evident probing depth, no furcation involvement and no mobility was found. An intraoral radiograph revealed periapical radiolucency associated with palatal root, suggestive of apical periodontitis (Figure 2). By Orthopantomogram it was evident that there was no involvement of adjacent vital structures and the pathosis was localised to 26 (Figure 3). Hence, the diagnosis was primary endodontic lesion along with mucosal fenestration[5].

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There was resorption on root apex of mesiobuccal root which was extensively filled with thick calculus and plaque deposits, also there was marked inflammation of the adjacent mucosa which was fiery red in colour and bleeding spontaneously on probing.

Treatment plan for managing the mucosal fenestration was to carry out, non-surgical debridement of the exposed root surface and the granulation tissue circumventing the exposed root, oral hygiene reinforcement to the patient followed by root canal therapy, afterwards periodontal flap surgery, and resection of exposed mesiobuccal root tip, sealing of apex with mineral trioxide aggregate cement and covering the defect with Platelet Rich Fibrin (PRF) membrane as to support the overlying flap and also for accelerated healing and possible regeneration of the marginal bone and finally primary closure of the mucosal fenestration and flap replacement.

The patient's written consent was taken and Root Canal Treatment (RCT) was carried out under 2% lignocaine (EL-Ligno ADR 2%, ELDER PROJECT LTD.), access to the pulp chamber was made occlusally through the carious lesion and biomechanical preparation was done with Protaper gold system, intermittent irrigation was performed using 3% NaOCl and saline.

Calcium hydroxide dressing was placed as intracanal medicament for 7 days, followed by obturation of canals with gutta-percha by single cone Protaper GP (F3, F2, F2 in palatal, mesiobuccal and distobuccal respectively) (Figure 5). After complete excavation of the carious lesion tooth was restored with resin based composite material.

After phase I therapy (Figure 4), surgery was performed under local anesthesia using 2% lignocaine. (EL-Ligno ADR 2%, ELDER PROJECT LTD). Crevicular incision was given on the buccal aspect using 15 number blade starting from mesial line angle of canine till distal line angle of the second molar. A full-thickness buccal mucoperiosteal flap was reflected beyond mucogingival junction with periosteal elevator. After flap reflection, loss of buccal cortical bone was evident exposing apical third to middle third of mesiobuccal root there was presence of thin but intact marginal bone of the buccal cortex which was covering 5 mm of the cervical region and the furcation of the tooth (Figure 6)

Partial root resection was performed and 5mm of the apical portion of the mesiobuccal root was resected with low speed latch type motor and straight fissure carbide bur (Figure 7), It was decided to leave 5mm of the cervical portion of the mesiobuccal root to prevent any trauma to the overlying thin 5mm of marginal bone this was done to provide some support and blood supply to the overlying soft tissue by the intact marginal bone and also to preserve as much crown root ratio as possible which will support the occlusal forces. Following this, all the granulation tissue was debrided from the defect. Apical region was then sealed from retrograde aspect of mesiobuccal canal using mineral trioxide aggregate (MTA). A biological PRF membrane was prepared by collecting 5 ml of the blood sample into a vacutainers. This was prepared by centrifugation at 4000 rpm for 8 min, and then the PRF clot is placed on the grid in the PRF box, and covered with compressor and lid, the membrane formed is then placed and adapted over the partially resected mesiobuccal root completely covering the alveolar fenestration (Figure 9). The surgical flap was sutured with sling suture using 3-0 silk (ethicon[®]), The epithelium lined collar of a mucosal fenestration was excised prior to flap replacement and suturing in order to improve epithelial attachment^(12,8,13,14), the mucosal fenestration was then sutured with three interrupted sutures using vicryl (ethicon[®]) and there was no tension while approximation (Figure 10).

A periodontal dressing (Coe-pack; GC America, USA) was placed, and medication (amoxicillin 500 mg thrice a day for 5 days and diclofenac sodium twice a day for 5 days) were prescribed to the patient for less postoperative discomfort and infection. Furthermore, instructions were given for the use of 0.2% chlorhexidine mouth (Rexidine SRS, INDOCO REMEDIES LTD) for 2 weeks, twice daily for oral hygiene maintenance followed by another one week after suture removal. Sutures were removed 1 weeks postoperatively and wound healing was uneventful.

The patient was instructed to maintain proper oral hygiene and was followed at 3 and 6 months. At the 6-month follow-up visit, radiograph showed bone fill and clinically complete resolution of mucosal fenestration (Figure 12). At 9-month follow-up, 26 was restored with porcelain fused to metal crown (PFM). The patient was further recalled till 14

months for follow-up to evaluate resolution of periapical pathology associated with 26 (Figure 11).

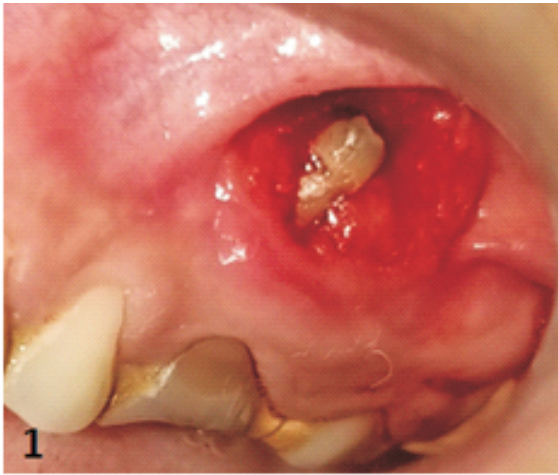


Figure 1: Pre-Operative view showing maxillary left first molar showing mucosal fenestration in respect of mesiobuccal root.



Figure 2: IOPR reveals carious maxillary left first molar with periapical pathology in respect to palatal root.

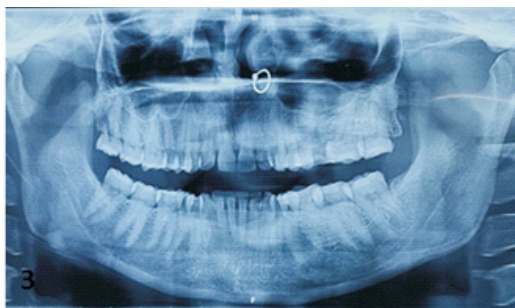


Figure 3: Orthopantomogram shows all normal anatomical landmarks without involvement of any adjacent vital structures.



Figure 4: 4 weeks Post non-surgical periodontal therapy showing resolution of all signs of inflammation.

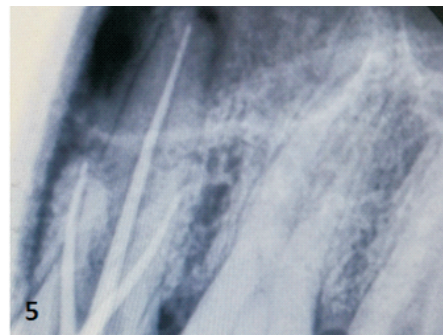


Figure 5: IOPAR showing Root canal therapy in respect to maxillary left first molar.



Figure 6: Full thickness mucoperiosteal flap raised reveals intact marginal bone with alveolar fenestration extending from middle third to apex of mesiobuccal root and apex of distobuccal root.



Figure 7: Partial root resection with respect to mesiobuccal root of maxillary left first molar.



Figure 8: Resected mesiobuccal root measuring 5mm.

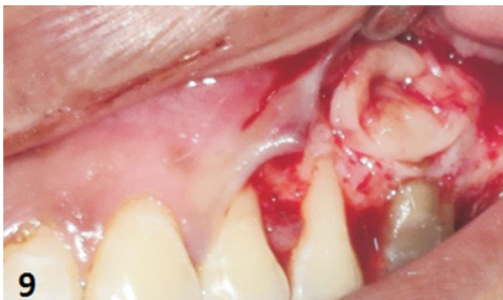


Figure 9: Platelet rich fibrin membrane placed over the resected mesiobuccal root to support the overlying flap and possible regeneration of the marginal bone.



Figure 10: Flap adapted and continuous sling sutures placed using 3-0 silk suture, The margins mucosal fenestrations are freshened with universal curette and primary closure was achieved using 4-0 vicryl suture.



Figure 11: 9 Months post operatively, Porcelain fused to metal crown was placed.



Figure 12: 6 months post-operative IOPAR in respect to maxillary left first molar, showing adequate bone fill in the resected mesiobuccal root region and resolution of periapical pathology.

Discussion :

Mucosal fenestration refers to a window-like defect of the overlying mucosa, often exposing the underlying root surface¹ which is more common in maxilla than mandible[6,7]. The epidemiological data according to Wong J et al in 2021 showed that most commonly these defects are seen in central incisors, as reported in 6 cases (21.4%), followed by maxillary first premolars, maxillary lateral incisors and mandibular central incisors, 5 such cases exist each (17.9%). There were 4 cases of maxillary first molars (14.3%) and 3 of maxillary canines (10.7%). Prevalence was highest in persons between the ages of 31 and 40 (28.6%) and least common in those over 60 (3.6%) [7].

In this case report it was evident that complete resolution of such defects are possible provided that the case selection and surgical modality is wisely chosen. In the literature review a variety of treatment options can be seen to treat such cases such as Guided tissue regeneration procedure^{8,9}, mucogingival graft technique[10,11], Root resection⁷, Flap replacement with primary closure of the defect^{12,13}, But the clinician should choose the treatment modality to treat such defects carefully based on the given scenario and prognosis.

In the given case report the crown root ratio was favourable and there was no mobility and minimal attachment loss, also after reflection of the mucoperiosteal flap it was seen that an intact band of marginal bone was present so decision was made to partially resect the exposed root, to save the intact marginal bone and to place PRF membrane to support the overlying flap and achieving primary closure of the mucosal fenestration.

PRF membrane was used because of its ability for hard and soft tissue regeneration and there is a sample amount of various growth factors such as platelet-derived factor, transforming growth factor- β , vascular endothelial growth factor, and epidermal growth factor which accelerates healing in the region [15].

In a case report by Yang et al in 1996 there was complete resolution of the mucosal fenestration after just endodontic treatment of associated tooth and primary closure of the mucosal fenestration [16]. Similar results are evident in this case report as well.

Conclusion:

Treatment of the Etiological factor which was the periapical pathology in the case along with surgical resection of the exposed root tip followed by primary closure of the mucosal fenestration after placement of PRF membrane was sufficient to resolve the defect completely. Satisfactory functional proficiency and esthetic improvements were achieved.

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