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# Single Flap Approach (Minimally Invasive Surgical Technique) For Management of Grade- II Furcation Defect In Mandibular First Molar Using Xenograft And Platelet Rich Fibrin – A Case Report

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***ABSTRACT:***
*The periodontal treatment mainly aims in regeneration of the lost tissues due to periodontal disease. Management of furcation involvement in a multirooted teeth is influenced by variety of factors. Since the anatomy of the furcation is complex, the regeneration of the defect is quite challenging. This case report describes about the minimally invasive single flap technique for management of grade II furcation involvement in a mandibular first molar using platelet rich fibrin and xenograft. The main aim of using a single flap approach is to make the extent of the surgical site as limited as possible so that the marginal tissue recession is avoided and also to decrease the patient discomfort by making both duration and surgical insult minimal. Following surgical debridement and placement of bone graft, radiographic bone fill was noticed in the furcation region at 8 weeks after surgery and the clinical probing pocket depth was reduced from 13mm at baseline to 3 mm at 12 weeks. A keen, sound diagnosis and removal of etiological factors can aid in restoration of health and function of the periodontium.*
***Key word:*** *Grade II furcation, Single flap approach, Platelet rich fibrin, Xenograft, Periodontal regeneration.*

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## I. Introduction

The ultimate goal of periodontal therapy is not only to arrest the progression of periodontal disease but also to restore the lost tissues and gain the function[1]. Periodontitis is an inflammatory disease of periodontium that is influenced by variety of environmental, genetic and host factors. Furcation involvement often remains to be a challenge for periodontists because of its complex anatomy, difficulty in instrumentation and its poor vascularity. Various patient factors such as presence of systemic diseases, behavioural and psychological factors influence the outcome of the treatment. Anatomic and site factors such as access to surgical site, interproximal bone height relative to furcation, root trunk length, root concavities, grooves, root proximity, furcation entrance width, tooth mobility, width of keratinised tissues, periodontal biotype, endodontic status has to be evaluated before periodontal surgery to evaluate the treatment outcome[2]. Grade II furcation involvement can be successfully treated with regenerative therapy. Guided tissue regeneration can give a predictable outcome in treatment of grade II furcation involvement with histologic evidence of definitive regeneration of the periodontium[3].

## II. Case report

**Case History:**

A 26-year-old female patient was referred from Department of Orthodontics to Department of Periodontology for opinion and management of 36. On obtaining history, patient gave a chief complaint of forwardly placed tooth in her upper front teeth region for the past 10 years. Past medical history was non-contributory and Past dental history revealed that the patient had undergone root canal treatment before 3 months. Patients' familial and hormonal history were non-contributory. Extra oral examination revealed apparently symmetrical face with convex profile, incompetent lips, no pain or deviation in the temporomandibular joint (TMJ) and lymph nodes were non tender, non-palpable.

Intra oral Examination revealed generalized pale pink gingiva with physiologic melanin pigmentation, rolled out marginal gingiva i.r.t 36, with loss of stippling i.r.t 36. Probing pocket depth (PPD) was 11 mm mid buccally (Fig 1) and 3 mm in all the other 5 sites around 36. Furcation involvement was noted Grade II (Tarnow and Fletcher) with horizontal component of 5mm (Fig 2) in buccal furcation i.r.t 36. Orthopantomograph (OPG)

(Fig 3) and Intra Oral Periapical Radiograph (IOPA) of 36 (Fig 4) revealed radiolucency in the furcation region of the 36 with sound interproximal bone without any loss of lamina dura and widening of periodontal ligament space in the apical third of mesial and distal roots of 36. The case was provisionally diagnosed as Localized Chronic Periodontitis with Grade II furcation involvement i.r.t 36.

**Treatment Done:**

Following diagnosis, Phase I therapy was carried out, Complete scaling was done and routine oral hygiene measures were reinforced. Patient was advised to use topical antimicrobial agent (Chlorhexidine gluconate and metronidazole gel 1% w/w) 2 weeks. The tissues were prepared for surgical phase. Patient was subjected to routine blood investigations and no abnormalities were detected. The surgical phase was carried out using single flap approach.


Fig 1


Fig 3


Fig 2

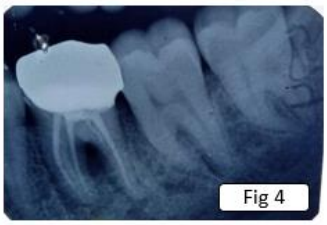


Fig 4

**Procedure:**

Left inferior alveolar nerve block and left long buccal nerve block were administered using 1:80000 Lignocaine. Under local anesthesia, sulcular and interdental incisions were made on the buccal aspects from mesial aspect of 35 to distal aspect of 37 using no. 15 BP blade (Fig 5). Full thickness mucoperiosteal flap was reflected using Molt's no. 9 periosteal elevator and the furcation was assessed using Naber's probe (Fig 6). During the process, the crown was removed. Ostectomy was performed using micromotor and TC 701 bur (Fig 7) with copious saline irrigation at furcation entrance to achieve access (Fig 8). Complete debridement was done, granulation tissues were removed using Area specific Gracey curettes (Hufriedy, Chicago, IL.,) (Fig 9). Osteoplasty was done using Schluger bone files (Fig 10).


Fig 5


Fig 6

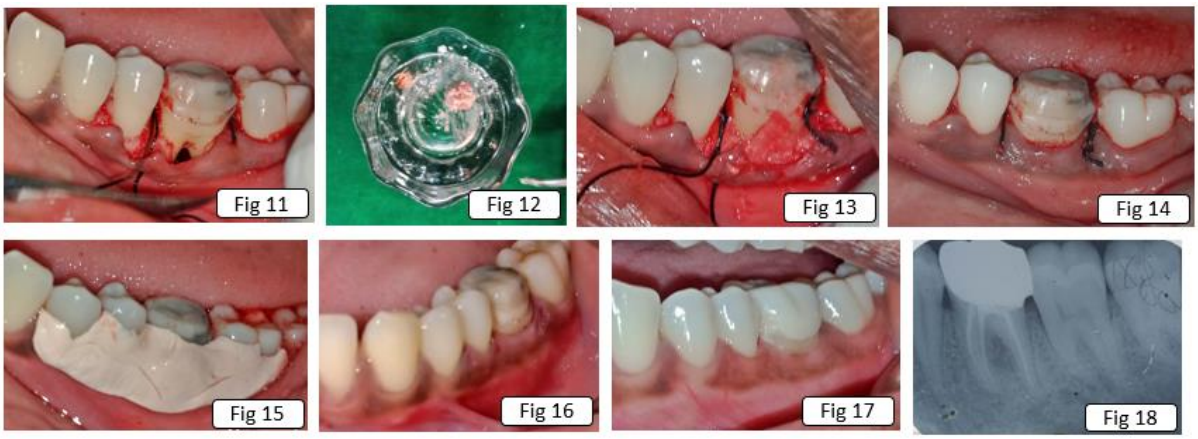

Fig 7


Fig 8


Fig 9


Fig 10

5 ml of intravenous blood was procured from the patient and centrifuged at 3000 rpm for 10 min (Choukroun's technique[4]) to obtain Platelet Rich Fibrin (PRF) using centrifuge (Remi Laboratories). PRF was minced with osseomold (Demineralized bone matrix/ xenograft with calcium sulphate hemihydrate) and was also used as a membrane (Fig 12). The site was pre-sutured (Fig 11) and the minced PRF was placed in the furcation defect. The PRF membrane was then placed (Fig 13) and sutured using 3-0 black braided silk by independent sling suturing technique i.r.t 35,36,37 (Fig 14). Immediate post operative IOPA was taken. Non eugenol periodontal dressing was given. As a post operative care patient was advised to take Cap. Amoxicillin 500mg TID for 5 days along with Tab. Aceclofenac (100mg), Paracetamol (375mg), Serratio-peptidase (10mg) TID for 5 days. Patient was advised to use chlorhexidine gluconate 0.2% mouthwash a day after twice daily for 7 days. Patient was recalled on 10$^{th}$ day for suture removal (Fig 16). Patient was recalled at 4$^{th}$ and 8$^{th}$ week and the wound healing was assessed. Crown was re-luted at 4$^{th}$ week (Fig 17). The healing was found to be satisfactory. The post operative IOPA revealed radiographic bone fill in the furcation area (Fig 18). The probing pocket depth was reduced to 3 mm mid buccally i.r.t 36 at the end of 10 weeks.




## III. Discussion

The present case report is about single flap approach for treatment of grade II furcation involvement with xenograft and platelet rich fibrin in mandibular first molar. An easier, less invasive surgical method for gaining access to intraosseous periodontal defects is the Single Flap Approach (SFA). Depending on the main buccal/oral extension of the lesion, the SFA involves elevating a small mucoperiosteal flap to allow access to the defect from either the buccal or oral aspect only, preserving the interproximal supra-crestal gingival tissues[5]. Guided Tissue Regeneration (GTR) aims in preserving the space for clot stabilisation and prevents epithelial migration along the cemental border of the pocket. GTR is a combination therapy since it is frequently carried out along with bone graft as a scaffolding agent[6].

In this case the furcation involvement was treated with single flap elevation only on the buccal aspect and demineralized bone graft (xenograft) along with calcium sulphate hemihydrate was used for achieving regeneration in the furcation defect. Moreover, the PRF was used as a membrane to prevent epithelial downgrowth so as to achieve true regeneration. Even if it is theoretically conceivable, the regeneration of class II furcation lesions is not thought to be a completely predictable process, particularly in terms of complete bone fill. Furcation morphology may make it difficult to do a sufficient debridement and may result in a reduction in number of cells that are available from the bone defect and periodontal ligament[7].

In this case, the inter-proximal bone was sound and the probing pocket depth was present only in the mid buccal aspect implying that the origin of infection to be from dental pulp which may have further resulted in spread to the periodontium. Usually, primary endodontic and secondary periodontal lesions do not require surgical debridement[8,9]. However, in this case grade II furcation involvement was noticed which will not resolve without surgical debridement. Since the furcation involvement was restricted only to the buccal aspect, the flap was raised only on the buccal aspect as a minimally invasive surgical approach.

Reviewing published data from trials done only on humans, the findings suggested that better outcomes are obtained in furcation defects treated with the combination of a bone graft and a membrane[10]. Poniaricro R et al in his clinical trials concluded that the use of GTR in grade II furcation as a better and superior alternative to the routine conventional surgical debridement in mandibular molars[11].

In this case, the PRF could have also possibly aided in healing by providing growth factors at the site of surgical defect. It has been hypothesized that the PRF contains various growth factors such as VEGF (Vascular Endothelial Growth factor), PDGF AA (Platelet Derived Growth Factor AA), PDGF BB (Platelet Derived Growth factor BB), FGF (Fibroblast Growth factor), IGF-1 (Insulin like Growth Factor- 1). It has also been proven that

the PRF can release growth factors up to 28 days which might have aided in remodelling of the tissues[12,13]. Within the limitations of this case report, use of PRF along with xenograft and a minimally invasive approach have resulted in better clinical and radiological outcome in treatment for grade II furcation involvement in mandibular molars.

## IV. Conclusion

There are numerous regeneration methods extensively used to achieve periodontal regeneration. The aforementioned instance indicates that a class II furcation defect can be successfully treated using a combination of therapeutic methods, such as the use of the GTR membrane in addition to the bone graft. Appropriate evaluation of clinical parameters is essential to obtain a predictable outcome in regeneration of such defects. However, histologic studies are required to confirm the true regeneration.

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