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Case Report **Periodontology**

Management of Grade–III Furcation by Guided Bone Regeneration: A 9 Months follow up Case Report

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Abstract

Grade III furcation involvement presents a significant periodontal challenge due to complete interradicular bone loss and limited regenerative potential. This case report described the management of a Grade III furcation defect using guided bone regeneration (GBR) and evaluated over a 9-month follow-up period. Following meticulous debridement, the defect was treated with a bone graft and barrier membrane to facilitate selective cell repopulation. Progressive improvement in probing depth, clinical attachment level, and radiographic bone fill was observed. The findings suggested that GBR may offer a predictable regenerative approach for selected Grade III furcation defects when proper case selection and surgical protocols were employed.

Keywords: Grade III furcation, Bone graft, Guided Bone Regeneration, Collagen membrane.

INTRODUCTION

The furcation regions of molars, owing to their complex anatomy and defect morphology, present a significant clinical challenge in terms of accessibility and effective periodontal management [1]. The primary objective of periodontal therapy is the regeneration of lost periodontal structures. Various regenerative approaches have been proposed for the treatment of furcation defects, including the use of bone grafts or substitutes, guided tissue regeneration (GTR), root biomodification, and growth factors [2]. Among these, GTR combined with a bone graft and resorbable membrane has been advocated as the preferred treatment modality for Grade III furcation involvement [3]. Ideally, successful periodontal regeneration is characterized by complete elimination of both horizontal and vertical components of the furcation defect through bone fill. However, clinical outcomes of GTR with osseous grafts in the management of Grade III furcation defects have demonstrated variable results [4]. The present article describes a case of Grade III furcation involvement managed using an alloplast in conjunction with a collagen membrane, with a follow-up period of 9 months.

CASE DESCRIPTION

A 26-year-old female patient reported to the department of Periodontology with a chief complaint of dull pain in the lower right back tooth for the past 3 months. A through history was elicited to rule out any relevant medical history and previous dental history. No significant habits or medical conditions were present. Phase-I periodontal therapy was performed, and the patient was reviewed 1 month later after completion of the endodontic treatment. On clinical and radiographical examination, a provisional diagnosis of chronic generalized periodontitis with grade III furcation involvement in relation to 46 was made (Figure-1).

Surgical Procedure-

Written and signed informed consent for periodontal surgery was obtained prior to the procedure. Preoperative probing depth in relation to tooth 46 was recorded using a Naber's probe, following which local anesthesia (2% lignocaine with 1:200,000 adrenaline) was administered. A full-thickness mucoperiosteal flap was elevated using crevicular incisions, extending buccally from the distal aspect of 45 to the mesial aspect of 47 and lingually from the distal aspect of 45 to the mesial aspect of 47. Thorough debridement of the root surfaces was performed using Gracey curettes. Osseous

destruction involving the buccal cortical plate of tooth 46 with exposure of the furcation area was evident (Figure-2).

PerioGlas®, an osteoconductive particulate bone graft, was mixed with sterile saline in a dappen dish and carefully placed into the furcation defect (Figure-3), ensuring that graft placement did not interfere with neovascularization. Subsequently, a bioresorbable GTR membrane (Healguide®), pre-soaked in normal saline to enhance adhesion, was positioned over the grafted site (Figure-4). The membrane was stabilized using 3-0 braided black silk simple interrupted sutures (Figure-5). A periodontal dressing (Coe-pack) was then applied to the surgical site (Figure-6), and care was taken to achieve tension-free flap closure.

Postoperative instructions and medications were prescribed, and the patient was advised to clean the surgical area using 0.2% chlorhexidine-soaked cotton swabs and to avoid tooth brushing in the operated region for one week. Sutures were removed one week postoperatively. Intraoral periapical radiographs (IOPAR) were obtained at 6 months (Figure-7) and at 9 months (Figure-8). No postoperative complications were observed during the follow-up period.

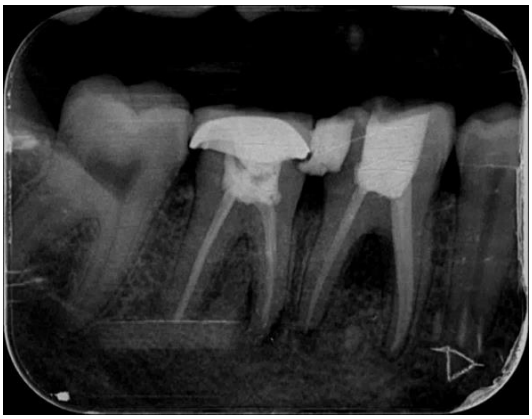

Figure-1: Pre-operative IOPAR

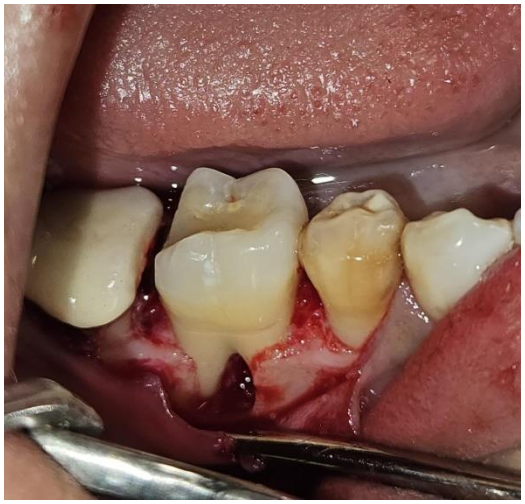

Figure-2: Incision and flap Reflection

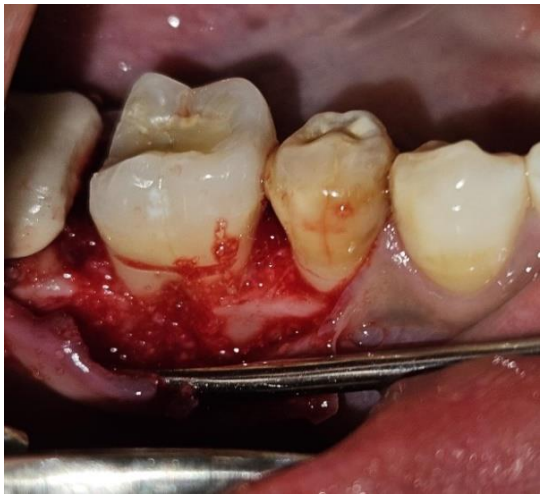

Figure-3: Placement of graft

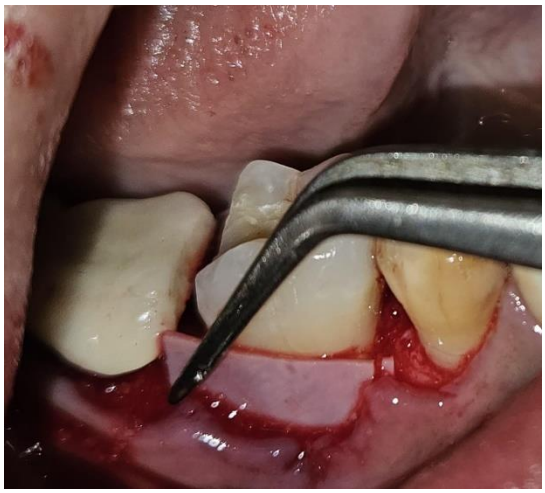

Figure-4: Placement of Membrane

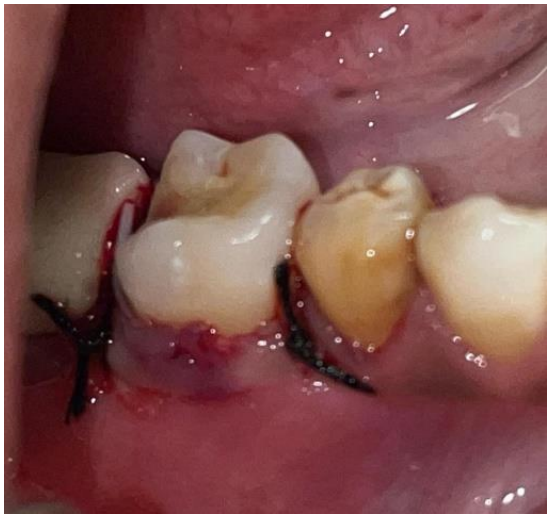

Figure-5: Placement of sutures

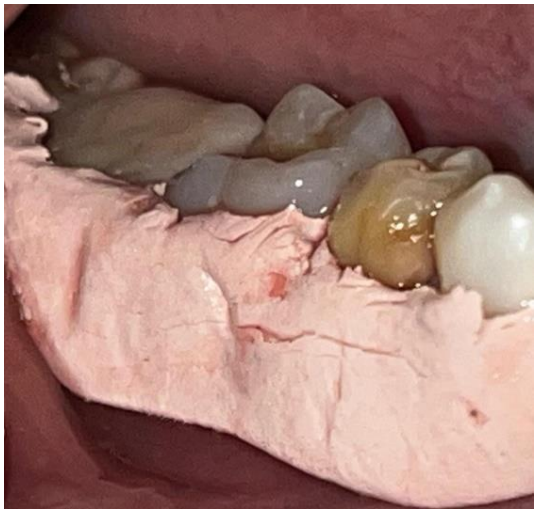

Figure-6: Placement of Coe-Pack

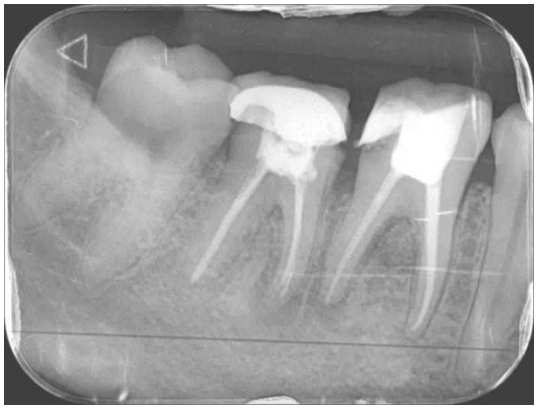

Figure-7: IOPAR after 6 months

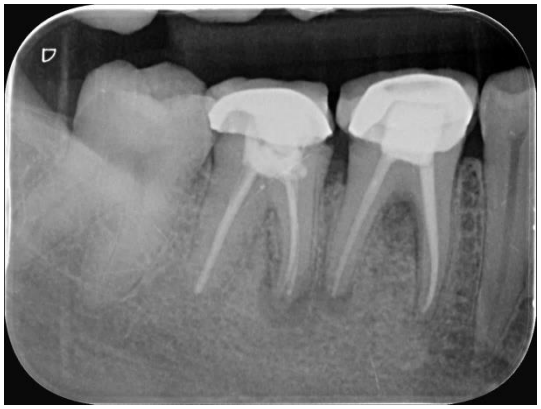

Figure-8: IOPAR after 9 months

DISCUSSION

Furcation involvement in periodontal disease poses a significant diagnostic and therapeutic challenge for the dental surgeon. According to Glickman's grading system [5], Grade III furcation involvement is characterized by complete loss of interradicular bone, resulting in a tunnel-like defect that remains covered by soft tissue on at least one surface. Regenerative osseous surgery in such defects is particularly demanding due to the absence of interradicular bone walls necessary for containment and stabilization of graft material during healing. Consequently, the use of a guided tissue regeneration (GTR) membrane becomes essential to stabilize the blood clot and act as a scaffold for selective cellular repopulation [6].

The combined use of bone grafts with bioresorbable membranes has been reported as a predictable treatment modality for managing Grade III furcation involvement in maxillary and mandibular molars [7]. The materials used in the present case were biocompatible, and no membrane exposure was observed during healing. Collagen membranes possess inherent haemostatic [8] and chemotactic properties [9], which promote clot stabilization, early wound healing, and enhanced fibroblast migration, thereby facilitating complete flap closure.

Predictable bone regeneration is dependent on adherence to the PASS principle proposed by Wang *et al.,* [10], which includes primary wound closure, angiogenesis, maintenance of defect space, and wound stability. Ge *et al.,* [11] demonstrated that debridement of subgingival pockets using an Er,Cr:YSGG laser is a safe and effective clinical approach. Additionally, Gupta *et al.,* [12] reported improved hard tissue outcomes with the use of Gengigel® in combination with a coronally advanced flap for the management of Grade II furcation defects compared to flap surgery alone. *Zhou et al* concluded that successful periodontal regeneration of grade III furcation defects could be achieved by using PRF in combination with bone allograft [13].

Anatomical complexities within the furcation region often hinder thorough debridement and root instrumentation, and the furcation roof provides limited vascular supply [14]. These factors contribute to the inherent difficulty in achieving predictable regeneration in furcation defects. In the present case, meticulous removal of granulation tissue using area-specific Gracey curettes was performed to minimize postoperative complications such as graft or membrane infection and potential rejection. The patient demonstrated good compliance with postoperative instructions and maintained regular recall visits. Periodic periodontal and radiographic evaluations were conducted, and oral hygiene measures were reinforced at each visit. The patient expressed satisfaction with the treatment outcome, which improved the periodontal prognosis of the affected tooth and eliminated the need for extraction and replacement.

CONCLUSION

This case report showed successful treatment of mandibular grade III furcation utilizing collagen membrane and bone alloplast. It suggested that the application of collagen membrane with bone alloplast may enhance periodontal regeneration and wound healing. Further large clinical trials and histologic investigations are needed to evaluate regenerative outcome to treat periodontal tissues.

REFERENCES

1. Novaes AB, Jr Palioto DB, de Andrade PF, *et al.,* Regeneration of class II furcation defects: determinants of increased success. Braz Dent J 2005;16(2):87–97.
2. Ramseier CA, Rasperini G, Batia S, *et al.,* Advanced reconstructive technologies for periodontal tissue repair. Periodontol 2000 2012;59(1):185–202.
3. Newman MG, Takei HH, Klokkvold PR, *et al.,* Carranza's clinical periodontology.Philadelphia: WB Saunders Co.; 2006. pp. 991–1004.
4. Jagannathan R, Rajendran S, Balaji TM, *et al.,* Management of Grade III Furcation Involvement in Molars by Regenerative Periodontal Therapy: A Report of Three Cases. World J Dent 2020;11(4):332–337.
5. Glickman I. Bifurcation involvement in periodontal disease. J Am Dent Assoc 1950;40(5):528–538.
6. Melcher AH. On the repair potential of periodontal tissues. J Periodontol 1976;47(5):256–260.
7. Khanna D, Malhotra S, Naidu DV. Treatment of grade II furcation involvement using resorbable guided tissue regeneration membrane: a six-month study. J Indian Soc Periodontol 2012;16(3):404–410.
8. Sowjanya NP, Rao N, Bhushan NV, *et al.,* Versitality of the use of collagen membrane in oral cavity. J Clin Diagn Res 2016;10(2): ZC30–ZC33.
9. Lanka M, Kurtzman GM, Sagrika S. Regeneration in periodontics: collagen: a review of its properties and applications in dentistry. Compend Contin Educ Dent 2015;36(5):358–363.
10. Wang HL, Boyapati L. "PASS" principles for predictable bone regeneration. Implant Dent 2006;15(1):8–17.
11. Ge L, Zhang Y, Shu R. Er,Cr:YSGG laser application for the treatment of periodontal furcation involvements. Photomed Laser Surg 2017;32(2):92–97.
12. Gupta S, Kediege SD, Gupta A, *et al.,* Evaluation of Gengigel® application in the management of furcation with coronally advanced flap through surgical re-entry - A split mouth clinical study. J Clin Diagn Res 2017;11(1): ZC27–ZC32.
13. Zhou Z, Qi X, Notice T. Treatment of mandibular grade III furcation involvement using platelet-rich fibrin and allogenic graft with 12-month follow-up - A case report. J Oral Biol Craniofac Res. 2020;10(4):542-546.
14. Bowers GM, Schallhorn RG, McClain PK, *et al.,* Factors influencing the outcome of regenerative therapy in mandibular class II furcations: part I. J Periodontol 2003;74(9):1255–1268.