Received: 15th April 2015 Accepted: 05th July 2015 Conflicts of Interest: None

Source of Support: Nil

Case Report

Management of Class-II Furcation Complicated with Endodontic involvement using Two Different Regenerative Materials

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How to cite the article:

Inamdar MNK, Khan S, Ali SA, Ahmad E. Management of class-II furcation complicated with endodontic involvement using two different regenerative materials. J Int Oral Health 2015;7(Suppl 2):82-84.

Abstract:

This paper presents a case series of furcation involved teeth complicated with endodontic involvement which were treated with periodontal, endodontic and restorative procedures using different bone regenerative materials like; (a) Calcium phosphosilicate bone substitute having bioactive glass 69% mixed with glycerin 19% and poly-ethylene 12% dispensed in a putty form; (b) hydroxyapatite 70% and β-tricalcium phosphate 30% dispensed in granular form. All the cases were randomly selected having Grade II furcation defect with primary or secondary endodontic involvement. All cases were under observation for a period of 9 months. Measurements at 9 months post-surgery demonstrated that dental putty as bone graft substitute which was in combination of bioactive glass mixed with glycerine and polyethylene glycol showed better result as compared granular bone graft which was in combination of hydroxyapatite and β-tricalcium phosphate.

Key Words: Bone graft, dental putty, furcation, hydroxyapatite

Introduction

Management of furcation defects complicated with endodontic involvement represents a formidable problem in the treatment of periodontal disease which is principally related to the irregular and complex anatomy of furcations.[1] Many surgical procedures have been tested on teeth with different classes of furcation involvement to induce new attachment and/or regeneration on molar with furcation defects which include the use of bone grafts as well as bone replacement materials.[1,2] This case report shows treating of furcation defects and intraosseous defects with synthetic graft materials and also have consistently demonstrated clinical advantages beyond that achieved by debridement alone.

Case Report

Cases were selected randomly, having Grade II furcation defect according to Hemp *et al.* classification in relation with mandibular or maxillary first molar. The tooth included could have primary or secondary endodontic involvement. The endodontic involvement was either due to: (i) Deep carious lesion involving the pulp, or (ii) non-vital tooth. Two cases from the selected patients were randomly divided into: (A) Treated with bioactive glass as bone graft substitute (Figure 1); (b) treated with hydroxyapatite as bone graft substitute (Figure 2).

Investigations

Cases were subjected to investigation which included, blood investigation (complete blood count), intraoral periapical radiograph, soft tissue recording which included both horizontal and vertical depth of furcation defect using Naber's probe and William's probe respectively.

Treatment

After Phase-I therapy, the cases were taken up for surgery wherein the surgical protocol was consistent for all the cases. Endodontic treatment was carried out first before periodontal surgery in primary endodontic cases. The periodontal surgery was carried out such that a full thickness flap raised up to the base of the defect followed by a split thickness flap beyond the mucogingival junction so as to visualize the base of the defect and at the same time make the flap displaceable. Respective materials were placed at the defect site and healing was observed for the period of 9 months.

Outcome and follow-up

Measurements at 9 months post-surgery demonstrated significantly good soft tissue responses in the treated sites. Dental putty as bone graft substitute which was in combination of bioactive glass mixed with glycerine and polyethylene glycol showed better result, followed by granular bone graft which was in combination of hydroxyapatite and β-tricalcium phosphate though gain in clinical attachment levels (CALs).

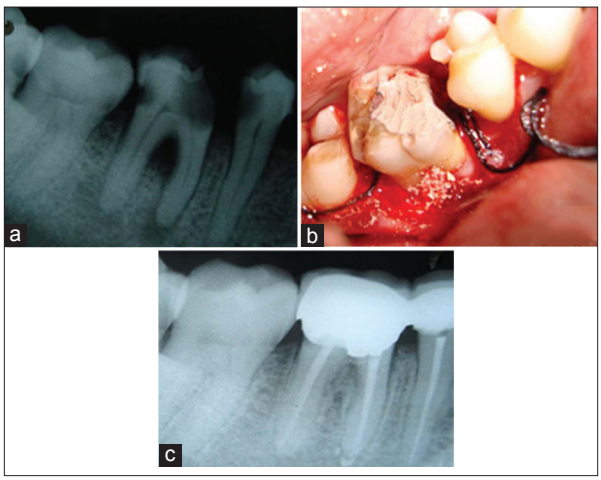

Figure 1: Case treated with bioactive glass bone substitute, (a) Pre-operative radiograph showing the furcation defect with endodontic involvement with right mandibular first molar, (b) intra-operative view showing the lesion being filled with bioactive glass bone substitute after complete debridement, (c) post-operative radiograph after 9 months showing remarkable bone fill at the furcation site.

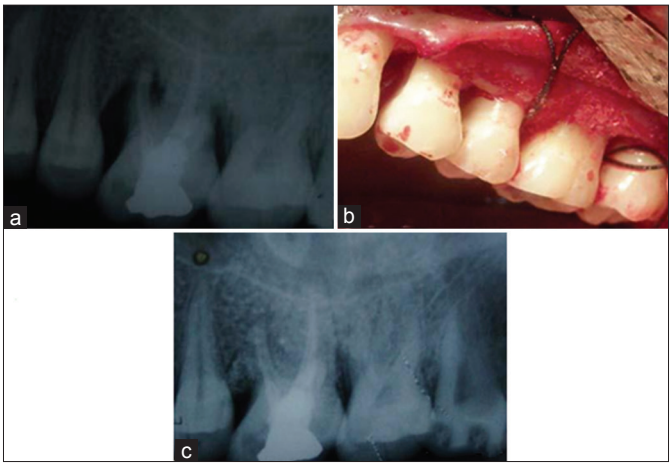

Figure 2: Case treated with hydroxyappetite granules, (a) Intra-operative view showing the furcation defect along with vertical defect on mesial aspect of left maxillary first molar with Williams probe, (b) intra-operative view showing the lesion being filled with hydroxyappetite bone substitute, (c) post-operative radiograph after 9 months showing significant bone fill at the furcation site and intrabony defect site with mesial root of left maxillary first molar.

Discussion

A recent study in humans compared bioactive glass particles and debridement of the flap in the treatment of 12 pairs of interproximal and 12 patients with intrabony periodontal defects. 6 months re-entry results demonstrated significantly great gains in CAL (2.6 ± 1.49 mm test, 1.0 ± 0.75 mm control) and in hard tissue fill with the bioactive glass (test) than with the flap debridement which is control group (unpublished data) (1.75 ± 1.08 mm test, 0.04 ± 0.50 mm control). Case report evidence of 37 sites which is utilizing bioactive glass alone, combination of autogenous bone and bioactive glass, and bioactive glass with decalcified freeze-dried bone is recently published.[1] The authors reported reduction in mean PD for 6 months 53%, 57%, and 53%, respectively and also mean gains in the probing attachment level of 5.3 mm, 4.S mm, and 5.6 mm. In the results no re-entries or control were included. In another recent clinical study by Zamet *et al.*[2] compared open flap debridement and bioactive glass in the treatment of 44 periodontal intrabony defects in 20 patients. The authors measured plaque, PD and bleeding scores, and CAL, *n* baseline, 3, 6, 9, and 12 months after post-surgery. Standardized radiographs is maintain by taking computer-assisted densitometric image analysis (CADIA) and were taken at baseline, immediately post-operatively and at period of 1-year. The authors reported that CAL and PD showed significant and mark an able improvement in the experimental and control sites, "with a greater trend to improvement in experimental sites." A noticeable increase was reported in radiographic density and volume in favor of the bioactive glass treated sites when it is compared with the open debridement treated sites with CADIA analysis. Surgical re-entries were not performed.[2]

In a Patus monkey surgical model, comparison was done in the clinical and histologic repair response of 45S5 bioactive glass, dense hydroxyapatite, tricalcium phosphate, and open debridement were done. Two-walled defects were surgically created and also the animals were sacrificed for a period 1, 4, and 6 months. In the bioactive glass implanted sites, there is less junctional epithelium migration, stopping at the level of the material and bone formation around the particles by 4 months. The hydroxyapatite sites showed more junctional epithelium migration. Consolidation was not done in the hydroxyapatite particles and were embedded in connective tissue.[3] In this study was also found bioactive glass are very easy to handle and manipulate than the other materials. Bioactive glass is also been used in treatment of humans, and bone loss due to periodontal disease and alveolar ridge resorption.[4]

Conclusion

Measurements were done after 9 months post-surgery demonstrated significantly good soft tissue responses in the treated sites. Dental putty as bone graft substitute which was in combination of bioactive glass mixed with glycerine and polyethylene glycol showed better result, followed by granular bone graft which was in combination of hydroxyapatite and β-tricalcium phosphate though gain in CALs and PD reduction was significantly better irrespective of the material used after 6 and 9 months post-surgery. These results indicate similar outcomes of the studies done earlier.[5-7] This also suggests that a properly restored endodontically compromised tooth is as good as a normal tooth with no periapical pathology.

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