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International Journal of Current Research
Vol. 7, Issue, 02, pp.12854-12857, February, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

CASE STUDY

EFFECTS OF BONE GRAFT SUBSTITUTES "HYDROXYAPATITE" (HA) IN PERIODONTAL INTRABONY DEFECT DUE TO DEVELOPMENTAL ANOMALIES- LOCALIZED TOOTH-RELATED FACTOR

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ARTICLE INFO

Article History:
Received 14th December, 2014
Received in revised form
14th January, 2015
Accepted 25th January, 2015
Published online 28th February, 2015

Key words:

Hydroxyapatite (HA),
Intra-Oral Periapical radiograph,
Intrabony.

ABSTRACT

The aim of the study was to evaluate clinical response of the hydroxyapatite as graft materials in the periodontal bony defects due to localized developmental tooth anomalies. Systemically healthy Male patient age 32 with a recurrent gingival swelling in relation to upper left side of tooth. Clinically there was periodontal pocket probing depth of 9mm (Williams marking periodontal probe) in relation to maxillary left lateral incisor ⎪2 due to presence of palatal groove. The lesion was treated surgically with the application of hydroxyapatite (HA) as grafting material without membrane. Clinical response of the tissue, regenerative potentiality and effectiveness of hydroxyapatite as a bone graft material for the treatment of periodontal intrabony lesion was observed. Pre and Postoperative treatment like bleeding on probing, probing depth, clinical attachment level, gingival recession was observe after periodontal therapy and Intra-Oral Periapical radiograph was also compared before and after 6 months of therapy. The present case shows that there is decrease in depth of periodontal pocket, increases in clinical attachment level, and increase in gingival recession, no bleeding on probing and presence of bone formation in the post operative Intra-Oral Periapical radiograph was found. From the present study it's concluded that hydroxyapatite (HA) can acts as effective bone graft substitute materials for the treatment of periodontal intrabony bony defect.

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INTRODUCTION

Periodontitis – A multifactorial disease mainly cause by interaction between dental plaque and the host response mostly seen in an indidividual who are susceptible to it. The presence of risk factor or other different factor like environmental, genetic, biological and other local factors plays an individual's more prone to periodontal diseases. If any one of those factors is present in an individual it increases a risk for development of periodontal diseases. Localized anatomic tooth- related factors like "grooves" present in tooth surfaces also contribute to the initiation and progression of periodontal diseases by enhancing plaque accumulation and prevents the effectiveness of plaque removal by normal oral hygiene measures (**Blieden, 1999**). So in an effort to overcome the progression of destructive periodontal diseases different approaches, technique and materials had been employed and the clinical outcome seems to be with varying degree of success. Started with open debridement (**Pritchard, 1957**) followed by placement of bone graft within the bony defect and compare the therapy with the application of barrier membrane and bone graft (Guided Tissue Regeneration GTR).

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In addition to that, therapies using different membrane with bone and bone substitute materials also had been tried and come out with variable clinical result (**Mc Clain and Schallhorn, 1993; Schallhorn and McClain, 1988; Blumenthal and Steinberg, 1990**). Hydroxyapatite is primarily a minerals component of bone, having osseous conductive, osteophillic and biocompatibility potentiality. Porous particulate hydroxyapatite with pore size (190-230 µm) acts as trellis for ingrowths of fibrovascular and subsequent deposition of new bone (**Holmes, 1979**). Other opinion regarding pore size and particles of DFDB having 100 to 200 or 250 to750µm respectively has been recommended for periodontal bone grafting procedure since an optimal pore size is has to be concerned for both endosteal and fibroblastic ingrowths when using as graft materials in periodontal bony defects (**Alan M. Polson, ?**). Hydroxyapatite is available in porous non-resorbable, a dense or solid nonresorbable and resorbable which are depends up on the temperature during processing.

The purpose of this case was study in order to find out the clinical impact of porous hydroxyapatite in periodontal bony defect in localized anatomic tooth- related factor in fusion teeth.

MATERIALS AND METHODS

A Systemically healthy male patient age 32 had reported with swollen of gum, bleeding on tooth brushing, with recurrent pus discharging. On clinically examination there was localized swollen of gingiva, tenderness on palpation and presence of periodontal pocket in relation to $\underline{|2}$ due to bucogingival groove in fusion of teeth Fig.1.

Fig. 1. Pre-clinical Examination with William's marking periodontal probe

On the first day of clinical examination, proper oral hygiene instruction, motivation a long with patient education regarding importance of plaque removal was instructed which the prime cause of the periodontal diseases is. Phase – I periodontal therapy likes supra and sub-gingival scaling along with root planing in relation to the lesion was started following next day of appointment. Patient was also advice to undergo Intra Oral Periapical radiograph for assessment of the bony lesion involvement Fig.2. With the subsequent appointment along with phase –I therapy the patient was keep under observation to see the clinical response of the lesion as well as the response from the patient till 1 months. Clinical examination of the periodontal pocket includes soft tissue response, probing depth; clinical attachment level was done to correlates with pre and post treatment outcome.

Fig.2. Shows Pre-Operative IOPA X-Ray After phase –I therapy

With prior consent from patient, localized periodontal lesion was explored surgically by raising full thickness conventional periodontal flap with only crevicular incisions (**Fermins A. Carranza and Henrry, ?**) under local anaesthesia. Fig 3. Full-thickness flap was raise with the help of periosteal elevator Fig 4. All the granulation tissue was removed. Proper root planing was done followed by irrigation with normal saline solution till the bony defect was prepared for placement of hydroxyapatite (HA) Fig 5.

Fig.3. Crevicular incision for conventional fullthickness periodontal flap

Fig.4. Full thickness periodontal flap

Fig.5 Shows intrabony defect

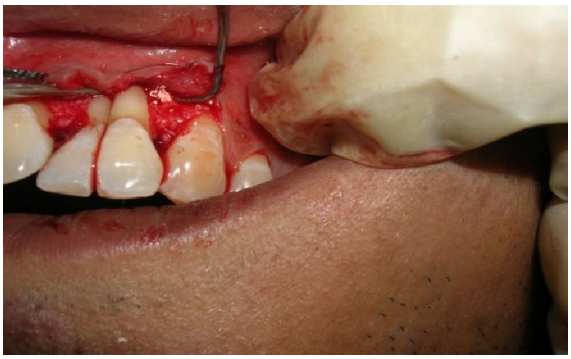

Fig.6. Placement of (HA) grafts material in intrabony defect

Bone grafting material hydroxyapatite (HA) was place in bony defect Fig 6, flap are approximated with concerted effort to achieve complete closure with suture without placing any membrane Fig 7. After placement of periodontal dressing, patient received post-operative instructions, an analgesic. 500mg of amoxicillin was prescribed three times daily for a week. The patient was then seen at 1 week postoperatively for removal of suture and periodontal dressing Fig 8. At 2 week patient oral hygiene were reinstated. The patient was keep under monthly recall visit for oral hygiene instruction, prophylaxis and evaluation of tissue response. After 6 months of periodontal therapy clinical examination, probing pocket depth, clinical attachment level and Intra Oral Periapical radiograph were repeated. Fig.9, 10.

Fig.7. Flap approximated with interrupted suture

Fig. 8. Shows seven days after removal of sutures

Fig. 9. Probing after six months of therapy

Fig. 10. Shows IOPA X – ray, after six months

Periodontal lesion with intrabony defects treated with the application of hydroxyapatite (HA) as a bone graft material in fusion tooth shows that there is decrease in bleeding on probing, decrease in probing pocket depth and increase in clinical level of attachment.

DISCUSSION

The clinical outcome of the present case shows that there is a *ray of hope* for the treatment of intrabony periodontal bone defect with the application of hyrdoxyapatite (HA) as grafting materials without use of membrane. But according to Carranza and H. Takei (**Firmins, ?**) unless all the perodontium structure which includes alveolar bone, cementum and periodontal ligament are regenerated in terms of architecture and functions it's a form of repair rather than regeneration. Evaluation of regeneration through histological study is the ultimate standard to decide the extent of periodontal regeneration in the treated area apart from direct measurement of bone, periodontal probing and radiographic analysis.

But histological analysis in human being at a single point of time that also precludes the longitudinal assessment of the study (**Michael S. Reddy and Marjorie, ?**) more over carrying out a histological study in human being has an ethical issues even prevail today which precludes histological study after regenerative therapy in human being. Used of porous hydroxyapatite for treatment of osseous defects had compare with DFDBA which shows there is reduction in probing depth and gain in attachment level. Other clinical method of assessment includes comparison of Pre and Post-Operative IOPA –X-rays, Probing depth and clinical attachment level.

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