Regenerative Approach in the Management of Osseous Defects : Case Series

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Abstract

Brief Background: Healing is a matter of time, but it is sometimes also a matter of opportunity. The regeneration of new periodontal attachment apparatus, after the natural attachment has been destroyed is one of the most challenging problems in dentistry. The goal of regeneration is to reconstitute the components of periodontium on to a root surface which was devoid of periodontal attachment. If the goal of periodontal regeneration is to be realized, it has to be approached from a basic molecular and biological perspective.

Materials and Methods: This case series present two cases of osseous defects and their management with two different regenerative approaches, one case with the introduction of a filler material into the defect, and the other case was treated with bone graft and guided tissue regeneration.

Discussion: The discussion includes the new attachment; the various bone grafts, their mechanisms, guided tissue regeneration, and the effects of combined techniques.

Summary and Conclusion : Various regenerative techniques used alone or in combination to treat the periodontal defects seems to demonstrate favorable healing outcome. This paper highlights different regenerative techniques for managing periodontal bone defects.

Key Words: Bone grafts; Guided tissue regeneration; New attachment; Periodontal defect.

Introduction

Periodontitis is an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment and bone loss and is characterized by pocket formation and/ or recession. Its onset may be at any age, but is most commonly detected in adults and may affect variable number of teeth with variable rates of progression. Hence it is reasonable to assume that the disease will progress further if treatment is not provided[1]. The goal of periodontal therapy has been stated as providing a dentition that will function throughout the life in health and comfort[2].

Periodontal therapy has been revolutionized by new treatment modalities aimed at regeneration of lost periodontal tissues3.The goal of regenerative procedures is elimination of periodontal defects by regenerating the lost periodontium including bone, cementum and periodontal ligament. Reconstructive modalities include surgical debridement with adjunctive root surface biomodification , implantation of bone, bone derivatives and substitutes, placement of barrier membranes for guided tissue regeneration, use of platelet rich plasma and enamel matrix proteins[4].

Case I. (Fig 1-9)

A male patient, aged 39 years reported to the Department of Periodontics with the chief complaint of mobility of upper front tooth since one year. Patient also gave the history of recurrent exudation and food impaction in relation to maxillary molars. The patient was a past smoker and alcoholic. Patient was systemically healthy and general examination revealed no significant findings. On intraoral examination gingiva was red in color and generalized bleeding on probing was elicited. Exudation on pressure in relation to maxillary molars was noted. On periodontal examination generalized periodontal pockets of 4 to 6 mms was noted. Periodontal abscess, Probing pocket depth of 7 mm and Grade II furcation involvement in relation to 26 was also noted.

Radiographs were advised and it revealed generalized horizontal bone loss with angular bone defect in relation to upper left first molar. The tooth was vital. Blood investigation found to be within normal limits .A diagnosis of chronic generalized Periodontitis with periodontal abscess was done. Over all prognosis and individual tooth prognosis of 26 was fair.

Treatment

Abscess drainage was done under local anesthesia by intrasulcular method. Thorough scaling and root planning was carried out. After reevaluation periodontal surgery was done .Full thickness periodontal flap was elevated, debridement and degranulation was done, the three wall defect was filled with bone graft with proper condensation of graft material in the defect. The barrier membrane was cut in to the proper size by using template and barrier membrane was placed over the bone graft. Sutures and periodontal dressing placed.

Case II. (Fig 10-17)

A male patient, aged 48 years reported to the Department of Periodontics with the chief complaint of missing right lower back teeth. Patient also gave the history of bleeding from gums while brushing. Patient was systemically healthy and general examination revealed no significant findings. On intraoral examination gingiva was re in color with generalized bleeding on probing. Exudation on pressure in relation to 36 was present. On Periodontal examination generalized periodontal pockets of 4 to 8 mms were noted. Probing pocket depth of 8mm, grade II furcation involvement and grade I mobility was seen in relation to 36.On radiographs generalized horizontal bone loss with angular bone defect was seen in relation to 36.The tooth showed delayed response on vitality evaluation. No significant finding was found in heamatological investigation. Based on clinical and radiographic findings the case was diagnosed as chronic generalized periodontitis. The over all prognosis and individual tooth prognosis of 36 was fair.

Treatment

Thorough scaling and root planning was carried out .Endodontic treatment was done. After reevaluation periodontal surgery was done .Full thickness periodontal flap was elevated, debridement and degranulation was done, and the osseous defect was filled with bone graft, with proper condensation. Sutures and periodontal dressing placed.

Discussion

New attachment with periodontal regeneration is the ideal outcome of therapy since it results in obliteration of the pocket and reconstruction of the periodontium. New attachment referred to those situations where in the fibrous attachment was restored on a root surface deprived of its connective tissue attachment due to the progression of Periodontitis[4]. Numerous bone graft materials have been used to aid in reconstruction of bone defects[5]. The biological mechanisms that support the use of bone graft materials are, osteoinduction, osteoconduction and osteogenesis[6].

Bone replacement graft has been used to help, facilitate and promote periodontal regeneration. Several bone substitute have been used in clinical periodontal therapy. They may be synthetically derived or processed from skeletal structure of other species. Porous hydroxylapatite has been shown to be osteoconductive when placed in long bones and mandibles of dogs[7].

In 1976 Melcher presented the basic concept which has led to the development of the clinical techniques known as guided tissue regeneration. Excluding the epithelium and the gingival connective tissue from the root surface during the post-surgical healing phase, not only prevents epithelial migration into the wound, but also favors repopulation of the area by cells from

the periodontal ligament and the bone [8].

Initial animal experiments using Millipore filters and Teflon membranes resulted in regeneration of cementum and alveolar bone and a functional periodontal ligament [9]. Implantation of hydroxyapatite particles and collagen complex promotes cementogenesis of demineralized root surface and can establish a stronger interdigitation between the root surface and the gingival connective tissue fibers (Minabe et al 1987) [10].

The addition of bone graft in combination with barrier has demonstrated improved defect fill, probing depth reduction and clinical attachment gain versus a barrier alone in human class II and III furcation involvement (American Academy of Periodontology 1989).

Conclusion

By combining and perfecting existing techniques, greater predictability for treating the advanced lesions can be achieved. Proper case selection, evaluation and appropriate execution of planned treatment following the principles outlined in the management of these cases can achieve results that meet the functional challenges of current dental practice. With new technologies such as genetically engineered proteins, controlled delivery systems, and resorbable membranes, to isolate the healing wound, total clinical regeneration of the periodontal attachment appears imminent.

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Legends

Case-I

1. Fig 1: pre- operative.
2. Fig 2: Pre-operative IOPA.
3. Fig 3: Osseous defect in relation to 26.
4. Fig 4: Hydroxyappatite bone graft.
5. Fig 5: Bone graft material placed in the defect.
6. Fig 6: Collagen Barrier membrane.
7. Fig 7: Barrier membrane placed over bone graft.
8. Fig 8: Suture placed.
9. Fig 9: Periodontal dressing

Case-II

Fig 10: Pre- Operative.
Fig 11: Pre-operative IOPA.
Fig 12: IOPA after Endodontic treatment of 36.
Fig 13: Armamentarium.
Fig 14: Periodontal Osseous Defect in relation to 36.
Fig 15: Bone graft Material in place.
Fig 16: Suture.
Fig. 17: Post Operative view.