RECOMBINANT HUMAN PLATELET-DERIVED GROWTH FACTOR BB- A NEW HOPE IN PERIRRADICULAR SURGERY

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ABSTRACT

Poorly healing wounds are a significant clinical problem in patients with large peri-radicular bone defect and teeth mobility. This paper reports the management of a 45 year old female patient with a large peri radicular bone defect and Grade II mobility of mandibular anteriors using recombinant human platelet-derived growth factor-BB (rhPDGF-BB) in combination with a scaffold autogenous bone graft.

Key Words: rhPDGF-BB; PDGF; Peri-Radicular Surgery

Introduction

Periradicular surgery is often indicated as a complementary procedure in cases where the conventional endodontic treatment fails. In addition to elimination of pathologic tissues, peri-radicular surgery usually involves apicoectomy, preparation of root end cavity and its filling with a retrograde filling material.¹

Materials have been developed for retrograde restorations with the usage of zinc oxide eugenol, Glass ionomer cement, EBA and Super EBA ; though none of these materials have been proved to provide any osteoinductive and osteoconductive properties.² An attempt has been made to receive the same in peri radicular surgeries by using guided bone regeneration with a combination of Ostofom and Recombinant Platelet Derived Growth Factor BB gel. The present paper reports the management of a 45 year old female patient with a large peri radicular bone defect and Grade II mobility of mandibular anteriors using recombinant human platelet-derived growth factor-BB (rhPDGF-BB) in combination with a scaffold autogenous bone graft.

Case Report

This 45 year old female was referred for apical surgery having a one month history of dental infection and pus drainage from the buccal mucosa adjacent to 41. A periapical view indicated that the 41 had advanced periodontitis. This tooth was effectively splinted (Figure 1). The treatment plan was to surgically expose the area for debridement, apicectomy and bone augmentation using Ostofom (Figure 1,2,3). Local anaesthetic was applied and a mucoperiosteal flap was elevated. The lack of buccal bone was immediately apparent. Ultra sonic instruments and curettes were used to debride the area. Once effective curettage was carried out and a small root tip preparation was done to allow a small retrograde filling to be placed (Figure 4,5).

The bony defect was then filled with (Figure 7) bone graft mixed with human Recombinant Platelet derived growth factor BB, placed in layers which were added and gently compressed into position; followed by Closure with 3-0 Silk and a Periodontal pack (Figure 8,9). This method was employed to incorporate the graft well within a blood clot as it starts to set. Once the desired amount of material was in place it was contoured. A membrane is not needed for this material further simplifying the procedure. The slightly alkaline nature of the material also inhibits post operative infection since the flap was taken well away from the site; it effectively enclosed the material supporting it well (Figure 8,9). This method illustrates...
a combination of therapies applied to a tooth with severe bone loss. Splinting was essential to encourage bony regeneration and prevent fibrous tissue formation long term (Figure 3). Six weeks post operative follow-up has demonstrated that the case management has been successful as indicated by periodontal repair (Figure 10).

Discussion
The use of polypeptide growth factors (PGFs) to regulate biological events affecting surgical outcome has recently attracted the attention of researchers. Among all PGFs, platelet derived growth factor (PDGF) and transforming growth factor (TGF-α) have been shown to promote cell growth, differentiation and periodontal regeneration. Platelet derived growth factor (PDGF) and TGF-α are abundant in the alpha granules of platelets and platelets are involved in the wound-healing process and represent a natural source of PGFs. Grotendorst in 1985 indicated that the level of various growth factors particularly PDGF may be limiting at the wound site and that the supplementation of these factors can accelerate the rate of new tissue formation. It can be rationalized that by increasing local concentrations of PGFs with the application of PDGF, the periodontal healing outcome would be enhanced. The findings of this case indicated that complete healing was observed in 6th week as this growth factor is applied locally it does not cause any side effects. Till date few studies have been undertaken to determine the role of PDGF in bone healing but none has been undertaken for a large periapical defect.

Conclusion
In conclusion recombinant human platelet-derived growth factor-BB gel with bone graft can be used to induce bone formation and inhibit recurrence of such cases with large periapical defects.

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