Periodontal Regeneration Enhanced: Clinical Applications Of Enamel Matrix Proteins

THE USE OF ENAMEL MATRIX DERIVATIVE IN THE TREATMENT OF PERIODONTAL DEFECTS: A LITERATURE REVIEW AND META-ANALYSIS

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ABSTRACT: *Background*—Periodontal disease results in the loss of the attachment apparatus. In the last three decades, an increasing effort has been placed on seeking procedures and materials to promote the regeneration of this tissue. The aim of this paper is to evaluate the effect of enamel matrix derivative (EMD) during regenerative procedures. In addition, a meta-analysis is presented regarding the clinical results during regeneration with EMD, to gain evidence as to what can be accomplished following treatment of intrabony defects with EMD in terms of probing depth reduction, clinical attachment level gain, defect fill (using re-entry studies), and radiographic parameters. *Methods*—The review includes *in vitro* and *in vivo* studies as well as human case reports, clinical comparative trials, and histologic findings. In addition, a meta-analysis is presented regarding the regenerative clinical results. For this purpose, we used 28 studies—including 955 intrabony defects treated with EMD that presented baseline and final data on probing depth, clinical attachment level (CAL) gain, or bone gain—to calculate weighted mean changes in the different parameters. The selected studies were pooled from the MEDLINE database at the end of May, 2003. *Results*—The meta-analysis of intrabony defects treated with EMD resulted in a mean initial probing depth of 7.94 ± 0.05 mm that was reduced to 3.63 ± 0.04 mm ($p = 0.000$). The mean clinical attachment level changed from 9.4 ± 0.06 mm to 5.82 ± 0.07 mm ($p = 0.000$). These results were significantly better than the results obtained for either open-flap debridement (OFD) or guided tissue regeneration (GTR). In contrast, histologically, GTR is more predictable than EMD in terms of bone and cementum formation. No advantage was found for combining EMD and GTR. Xenograft, or EMD and xenograft, yielded inferior results compared with EMD alone, but a limited number of studies evaluated this issue. Promising results were noted for the combination of allograft materials and EMD. *Conclusions*—EMD seems to be safe, was able to regenerate lost periodontal tissues in previously diseased sites based on clinical parameters, and was better than OFD or GTR. Its combination with allograft materials may be of additional benefit but still needs to be further investigated.

Key words. Enamel matrix derivative, Emdogain®, meta-analysis, periodontal regeneration.

(I) Introduction

One goal of periodontal therapy is to provide a dentition that functions in health and comfort for the life of the patient (Zander *et al.*, 1976). Studies reporting tooth loss among patients receiving periodontal treatment show that, for the majority of these patients, this goal is a reality (Hirschfeld and Wasserman, 1978; McFall, 1982; Nabers *et al.*, 1988). The validity of this statement is enhanced in view of the contrary results observed among those who were untreated (Becker *et al.*, 1979).

Therapeutic approaches to the treatment of periodontitis generally fall into two major categories: those designed to halt the progression of periodontal attachment loss, and those designed to regenerate or reconstruct lost periodontal tissues (Pihlstrom and Ammons, 1997). Surgical procedures involving root conditioning, autografts, allografts, xenografts, and/or barrier membranes for guided tissue regeneration have been shown to contribute to a successful regenerative outcome (for review, see Garrett, 1996).

Despite the convincing histological evidence that some regeneration may occur in humans following a regenerative surgical approach (Bowers *et al.*, 1989a,b,c), complete and predictable regeneration is still a goal that is difficult to attain. In the last three decades, investigators have increased their efforts to seek procedures and materials to promote periodontal regeneration. Since growth and differentiation factors have been shown to play a key role in wound healing, it was suggested that they could enhance the regenerative process (for review, see Giannobile, 1996). Promising results have been obtained on healing and regeneration of lost attachment with application of recombinant human osteogenic protein-1 (OP-1) in surgically created critical-size class III furcation defects in dogs (Giannobile *et al.*, 1998). Moreover, periodontal regeneration has been demonstrated histologically in humans following the use of purified recombinant human platelet-derived growth factor BB (PDGF-BB) mixed with bone allograft in both Class II furcations and interproximal intrabony defects (Nevins *et al.*, 2003). Although the use of growth factors has demonstrated significant repair and/or regeneration, it is still considered experimental, since no growth factor therapy to treat periodontitis in humans has received approval by the United

lestellediadua.com: Periodontal Regeneration Enhanced: Clinical Applications of Enamel Matrix Proteins () by Thomas G., Jr. Wilson and a great.Periodontal Regeneration Enhanced: Clinical Applications of Enamel Matrix Proteins. Front Cover. Thomas G. Wilson. Quintessence Publishing Company, COUPON: Rent Periodontal Regeneration Enhanced Clinical Applications of Enamel Matrix Proteins 1st edition () and save up to 80% on.Periodontal Regeneration Enhanced: Clinical Applications of Enamel Matrix Proteins / Edition 1. by T. G. WilsonT. G. Wilson. Read Reviews.Controlled clinical studies in intrabony defects . Application of enamel matrix proteins in the form of Emdogain has set a modern standard Application of EMD may enhance periodontal regeneration in mandibular class II.The first studies on clinical applications with EMD were published in (1, 2) and The role of enamel proteins in periodontal ligament formation is supported by .. Porcine enamel matrix derivative enhances trabecular bone regeneration.ing enamel matrix proteins (EMPs) in regenerative periodontal therapy. Based on the available clinical applications for the treatment of different types of. periodontal . are manifold and include improved wound healing and. involvement in.Enamel Matrix Proteins and Periodontal Wound Healing and Regeneration Introduction: The goal of regenerative periodontal therapy is the and clinical applications of an enamel matrix derivative (EMD) protein in periodontal . human periodontal ligament stem cell sheets enhanced by enamel matrix.ing the clinical use of enamel matrix derivative (EMD). Original key regenerative proteins capable of promoting periodontal regeneration includ-. ing new .. Microvascular cell differentiation and angiogenesis are improved.Straumann Emdogain for significantly enhanced wound healing. . ? Higher clinical attachment level (CAL) gains and probing pocket depth reductions4,5, and long-term fewer complications. (compared with the use of membranes)9 . B. Enamel matrix proteins in the regenerative therapy of deep intrabony defects.Emdogain is an enamel matrix protein that has been shown to make the root more From: Clinical Review of Oral and Maxillofacial Surgery (Second Edition), ?Application of certain regenerative proteins can aid in the formation of . matrix proteins could enhance new cementum and bone formation in periodontal.is presented regarding the clinical results during regeneration with EMD, to gain evidence as to what can be tion of the enamel matrix proteins onto the dentin surface, the enhance EMD precipitation, thus exposing the periodontal lig-.Purified enamel matrix proteins have been extracted from porcine developing enamel, and their use for periodontal tissue regeneration has shown enamel matrix proteins have characteristics that could enhance periodontal regeneration.The clinical need for this class of medical devices will continue to grow as the field Shrout, Effects of enamel matrix protein application on the viability, proliferation, and [10] L. Hammarstrom, L. Heijl, S. Gestrelius, Periodontal regeneration in a Porcine fetal enamel matrix derivative enhances bone formation induced by.Clinical studies on enamel matrix proteins have focussed on healing mechanisms and use the knowledge gained to develop improved.Biomimetics in periodontal regeneration:

rationale and clinical use of enamel matrix derivative / David L. Cochran [et al.].