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REVIEW ARTICLE

An overview of periodontal regenerative procedures for the general dental practitioner

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Abstract The complete regeneration of the periodontal tissues following periodontal disease remains an unmet challenge, and has presented clinicians with a remarkably difficult clinical challenge to solve given the extensive research in this area and our current understanding of the biology of the periodontal tissues. In particular as clinicians we look for treatments that will improve the predictability of the procedure, improve the magnitude of the effect of treatment, and perhaps most importantly in the long term would extend the indications for treatment beyond the need for single enclosed bony defects to allow for suprabony regeneration, preferably with beneficial effects on the gingival soft tissues. A rapid development in both innovative methods and products for the correction of periodontal deficiencies have been reported during the last three decades. For example, guided tissue regeneration with or without the use of bone supplements has been a well-proven treatment modality for the reconstruction of bony defects prior to the tissue engineering era. Active biomaterials have been subsequently introduced to the periodontal community with supporting dental literature suggesting that certain factors should be taken into consideration when undertaking periodontal regenerative procedures. These factors as well as a number of other translational research issues will need to be addressed, and ultimately it is vital that we do not extrapolate results from pre-clinical and animal studies without conducting extensive randomized clinical trials to substantiate outcomes from these procedures. Whatever the outcomes, the pursuit of regeneration of the periodontal tissues remains a goal worth pursuing for our patients. The aim of the review, therefore is to update clinicians on the recent advances in both materials and techniques in periodontal regenerative procedures and to highlight the importance of both patient factors and the technical aspects of regenerative procedures.

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1. Introduction

The general goals of periodontal therapy include: 1. The primary and secondary prevention of periodontal disease by controlling infection and inflammation and 2. The maintenance and improvement of the health, function, comfort and aesthetics of all supporting structures and tissues (gingivae, periodontal ligament [PDL], cementum and alveolar bone).

A number of "so called" pathological entities may necessitate special attention, either because they are considered to be areas of *minoris resistentiae*, e.g., intrabony and interradicular defects (Papapanou and Tonetti, 2000), or because of perceived aesthetic concerns and/or pain to the patients, e.g., marginal tissue recession defects (Chabanski and Gillam, 1997). Therefore the ultimate goal for periodontal treatment is the regeneration of the lost periodontal tissues. The reconstructive surgery has been one of the most dynamic therapeutic procedures in periodontology for the past three decades, and yet, the ultimate goal of regeneration of the periodontal supporting tissues remains unpredictable and challenging.

2. Osseous defects

Based on clinical observations and observations on human skulls bony defects as a result to periodontal disease can be classified as:

- *Suprabony or supracrestal:* when the base of the pocket is located coronal or occlusal to the bone crest,
- *Infrabony or subcrestal:* when the apical end of the pocket is located below the bone crest. An infrabony defect may be subdivided to intrabony defect when the subcrestal component involves the root surface of only one tooth and crater when the defect affects the root surfaces of two adjacent teeth on an equal extent (Goldman and Cohen, 1958).

An intrabony defect therefore can be sub classified, with respect to the number of remaining bony walls, in three categories: the 1-wall, 2-wall and 3-wall defects (Goldman and Cohen, 1958).

The furcation involvements may also be included in the group of periodontal bony defects. One of the earliest

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