Group C
Consensus Paper
Periodontal regeneration - fact or fiction?

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Introduction

To discuss the topic of periodontal regeneration this working group determined the need to clarify some definitions relating to the biological and clinical outcomes of periodontal regeneration. Subsequently the group considered two key issues:

1. What are the benefits of periodontal regeneration?
2. What are additional considerations that should be taken into account when using regenerative agents?

A number of recommendations were thus developed.

The background for the discussion was presented in the Initiator Paper. The fundamental question raised for discussion was whether periodontal regeneration is "fact or fiction." To answer this question, a comprehensive narrative review of the literature was presented. It was noted that many regenerative techniques have been developed with the aim of obtaining reliable and clinically

Presented at the First IAP Conclave, Bangkok, Thailand, 11-13 April, 2014

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significant periodontal regeneration. To date there has been some success but in general the procedures are very technique-sensitive and often clinically unpredictable. There is no doubt that periodontal regenerative procedures have been shown to be biologically successful at the histological level. Furthermore, the clinical outcomes of periodontal regeneration (particularly guided tissue regeneration) have been shown to be stable over the long term (at least up to 10 years) However, whether the slight clinical improvements offered by periodontal regenerative procedures are of cost or patient benefit with regards to improved periodontal health and retention of teeth remains to be established. It was concluded that there is more work required to move periodontal regenerative medicine to a more reliable and clinically predictable procedure, and that future research will need to focus on further understanding of the biology of both developmental and regenerative processes.

Definitions

Biological definition of periodontal regeneration

Periodontal regeneration is a biological term defined histologically as reconstitution (*restitutio ad integrum*) of the tooth's supporting tissues, including alveolar bone, periodontal ligament and cementum over a root surface deprived of the attachment apparatus.

Clinical perspective of periodontal regeneration

From a clinical point of view periodontal regeneration will be reflected in gain of clinical attachment and reduced probing pocket depth. However, using these parameters it is not possible for a clinician to differentiate between reparative healing and periodontal regeneration. For these reasons, and because of the wide range of regenerative materials available, the clinical outcome can best be considered as reconstruction rather than regeneration.

Definition of periodontal reconstruction

Reconstruction of periodontal tissues is a clinical term characterized by reparative and/or partial regenerative healing, which results in improvement of clinical (gain of clinical attachment, reduced probing pocket depth) and radiographic parameters.

Question 1. What are the benefits of periodontal regeneration?

Periodontal regeneration has the potential to improve prognosis and longevity of the tooth. Systematic reviews suggest that the use of membranes, grafting materials with membranes and/or regenerative materials such as enamel matrix proteins, yield superior outcomes in terms of clinical attachment gain, pocket reduction and radiographic bone gain compared to open flap debridement alone (Needleman *et al.* 2006; Trombelli *et al.*, 2002; Reynolds *et al.*, 2003; Sohrabi *et al.*, 2012).

Clinically, periodontal regeneration remains difficult to achieve in a predictable and substantial way (Needleman, 2006). Periodontal regenerative procedures have been shown to be technique-sensitive. The outcomes of periodontal regeneration are influenced by patient, defect, materials, and operator factors that may require the use of evidence-based decision algorithms. Control of inflammation and infection is a pre-requisite before undertaking reconstructive/regenerative procedures. Under ideal conditions and careful case selection, significant clinical improvement can be achieved.

Question 2. What additional considerations which should be taken into account when using regenerative agents?

Recognizing that approved products and devices have been used with proven efficacy and no reported severe adverse reactions, certain issues still exist in the use of regenerative materials which must be acknowledged. These include:

- Cost/benefit
- Ethnic, religious and cultural issues
- Hybrid or copy agents
- Off-label use
- Risk of disease transmission
- Risk of unwanted immunological reactions
- Risks not apparent at the time of product release
- Unrealistic dentist/patient expectations

Recommendations

From this consensus report the following recommendations regarding periodontal regeneration were made:

1. Recognize and understand the difference between regeneration and reconstruction.
2. Control of inflammation and infection is a requisite before and after undertaking reconstructive/regenerative procedures.
3. Case selection is critical to the treatment outcome.
4. Be aware of the limitations of assessment criteria for evaluating the outcomes of reconstructive/regenerative procedures.
5. Recognize that reconstructive/regenerative procedures are technique-sensitive and the outcome may be variable.

Conclusion

Periodontal regeneration can result in improvement of clinical and radiographic parameters and has the potential to enhance the prognosis and longevity of teeth.

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