Introduction

Vision of Regenerative Periodontology

Retaining teeth in natural occlusion and function, being esthetically and harmonically integrated with oral-facial esthetics, is the ultimate goal of dentistry. Implants led to a paradigm shift in restorative dentistry and provided excellent options in replacing missing teeth. Still, considering the challenges with the relatively frequently appearing mechanical and biological complications at implants, these should only be offered when the natural teeth are missing or cannot be retained. Regenerative periodontics has revolutionized the clinical practice and can deliver predictable solutions for restoring the lost tissue integrity around the teeth, provided proper case and treatment selection and execution, empowering dentists to successfully manage periodontal disease and keep their patients’ teeth in their mouths. To achieve both hard and soft tissue regeneration is not an easy task and requires an in-depth understanding of biology, anatomy, physiology, and pathology. Teeth are exposed to an external environment, flooded with one of the most diverse microbiomes in the human body, and under the continuous functional forces, and thus present a unique challenge that the other medical professionals do not experience. Periodontal tissue regeneration not only builds what is lost but also promises a functional unit that is resilient to microbial and physical insults.

We are living in exciting times when science and research are more translatable and practically within reach for clinicians. This volume was planned before the Covid-19 pandemic of 2020 to 2021. As in many other fields in medicine, the pandemic was a challenging time for dentists. Many of us worked through and survived this unprecedented phase in the history of human civilization. As being truly frontline workers everywhere in the world, we adapted and learned how to provide our services to our patients. We also became more aware of what we can do as dental professionals to restore our patients’ health. The pandemic also provided us with innovation that has
never been experienced in human history. Furthermore, resources of the scientific world combined with a global urge to fight against the pandemic have truly translated scientific research to every corner of the globe through vaccines. Such scientific advancements will be incorporated in understanding the mechanisms and developing of treatment strategies for many diseases, including periodontitis.

The timing of this volume is critical. Although we are building on our understanding of periodontal regenerative medicine, we incorporate the most recent technologies. The journey starts with an overview of the biological basis of periodontal regeneration. We then cover one of the most critical issues that determine the success of regenerative approaches: decontamination of root surfaces and keeping the environment infection-free. Next, we focus on inflammation as a modulator of periodontal regeneration and how we can take advantage of recent innovations in the resolution of inflammation as a regenerative strategy. This is followed by an excellent article on stem cells and their potential in periodontal regeneration that paves the way for the next 2 articles on clinical approaches for hard and soft tissue regeneration. We then move on to the long-term outcomes following regenerative techniques and on how these approaches can improve long-term tooth prognosis. The final 2 articles are focused on emerging nanomedicine concepts in periodontal regeneration and the use of biomarkers in the prediction and prognosis of clinical procedures.

Overall, this volume is intended to bring the experts in this field to look into future applications and technological advances. It is not our intention to replace excellent and comprehensive reviews and consensus reports. However, our goal is to pave the way for an updated, but also simplified, understanding of innovation in periodontal practice to deliver our promise of the retention of patient’s teeth.

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