
Nanotechnology in Endodontics

Anil Kishen
Editor

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Current and Potential Clinical
Applications

 Springer

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This book is dedicated to my teachers, students, colleagues and family for making a difference.

Anil Kishen

Preface

Current understanding emphasizes that endodontic disease is a biofilm-mediated infection. Therefore, elimination of biofilm bacteria from the root canal system remains to be the primary focus in the management of endodontic disease. Unfortunately, the endodontic environment is a challenging locale to eliminate surface-adherent biofilm bacteria. This advanced antimicrobial strategies are required for the optimal disinfection of previously infected root canal system. This step is crucial not only to predictably perform conventional root canal treatments but also to develop tissue engineering-based strategies that can achieve organized repair or regeneration in previously infected teeth.

Nanotechnology is a rapidly advancing interdisciplinary field, and the use of nanomaterials is becoming more and more common for different health-care purposes. Generally, nanomaterial-based approaches present distinct advantages over conventional approaches. At the nanometre scale, the characteristics of materials appear to be markedly different to those of the same material at the macro scale. Nanotechnology/nanoparticles in endodontics can offer different benefits, ranging from efficient miniaturization techniques to approaches that control the molecular assembly, all of which can create exciting opportunities for the prevention, diagnosis and treatment of endodontic disease.

This book is aimed to provide a comprehensive understanding of the current and potential application of nanoparticles in endodontics. Chapters 1, 2, and 3 cover the fundamental aspects of nanomaterials, with potential applications in endodontics. The basis of nanotechnology and nanomaterials in tissue engineering, methods for characterizing nanomaterials/nanoparticles, techniques to assess the cytotoxicity in nanomaterials/nanoparticles and the basis of nanomaterials/nanoparticles in drug and gene delivery are covered in these chapters. Chapters 4, 5, 6, and 7 deal with the applications of nanoparticles that are more specific to the field of endodontics. Antibacterial nanoparticles, nanoparticles for dentin tissue stabilization, nanoparticles in restorative/endodontic materials and the application of nanomaterials for minimally invasive treatment of dental caries are covered in these chapters.

This book is intended for graduate students and practising clinicians with interest in the new and exciting field of nanomaterials/nanoparticles.

Toronto, ON, Canada

Anil Kishen, BDS, MDS, PhD

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