**Current concepts in root canal disinfection and impact of nanoparticles-guided therapeutics**

Part 1: Apical periodontitis is described as an inflammatory response to microbial biofilm in the root canal system. Microbial biofilms are particularly resistant to antimicrobials and are difficult targets to eliminate during disinfection procedures. Root canal biofilm is an important therapeutic target to eliminate during irrigation. This lecture will deliberate the fundamentals and current status of root canal irrigation.

Learning objectives:

* Understand challenges and fundamentals in root irrigation
* Learn the steps to improve efficacy of root canal irrigation
* Review the current status of different technologies for root canal irrigation

Part 2: Endodontic technologies and biomaterials have witnessed substantial advances in the last decade. In spite of these advances, some of the integral challenges in endodontic treatment continues to persist. Nanoparticle guided therapeutics that predictably disinfect the infected root canal system, reverse disease-mediated dentin matrix changes and regulate post-treatment healing have the potential to transform current concepts for a major paradigm shift in root canal treatment. This lecture aims to cover the fundamentals and applications of engineered nanoparticles in the treatment of teeth with apical periodontitis.

Learning Objectives:

* Learn the basics of engineered nanoparticles
* Learn the mechanisms by which engineered nanoparticles reverse disease/iatrogenic dentin changes and improve mechanical integrity
* Learn the role of engineered bioactive nanoparticles in root canal disinfection

**Brief Bio**

Dr. Anil Kishen is a Full Professor in Endodontics at the Faculty of Dentistry and the Principal Investigator at the Dental Research Institute, University of Toronto. He is the Graduate Coordinator for Graduate Education at the Faculty of Dentistry, and is cross-appointed with the Department of Dentistry, Mount Sinai Hospital, Toronto. He has published over 200 peer-reviewed publications, 24 book-chapters, 3 books, including books on Root Canal Biofilm and Nanotechnology in Endodontics. He is a co-inventor in 12 patents/invention disclosures.

Dr. Kishen has received several awards and honors including *The* *Enterprise Challenge Innovator (Singapore)*, American Association of Endodontists (AAE) Foundation-Denstply-Research Excellence and *W. W. Wood Award* *(Canada)* for excellence in dental education. He is also the Recipient of the prestigious 2020 *Louis I. Grossman Award* from the AAE for cumulative publication of significant research studies that have made an extraordinary contribution to endodontology.

Dr. Kishen serves as the Associate Editor for the Journal of Endodontics, BMC Microbiology, Clinical Oral Investigations, and Frontiers in Dental Medicine. He is a pioneer and world leader in the field of nanotherapeutics for oral health. His research lab focuses on engineered nanoparticles-guided tissue-engineering. He has presented over 175 invited/plenary lectures. Publications from his research has to date received >9000 citations.