

Minimally Invasive Endodontics a Promising Future Concept: A Review Article

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Abstract

The primary aim of endodontic therapy is the long-term retention of a functional tooth by preventing or treating apical periodontitis. However, the outcome of the endodontic treatment is multifactorial such as the quality of the restoration and structural integrity of the tooth after root canal preparation. Dentists need to reassess and recalibrate the endodontic and restorative techniques to best suit the way that they practice today. At the same time, need to preserve essential tooth structure to routinely achieve a 50-year, not a 5-year, successful outcome. Contemporary research efforts are currently directed to better understanding dentin behavior and structure during aging and function. An alternative approach is to minimize structural changes during root canal therapy, which may result in a new strategy that can be labeled "minimally invasive endodontics (MIE)." MIE is desirable in the interest of the patient, and preserving tooth structure requires optical magnification aids (surgical microscope), ultrasonic-assisted preparation techniques, modern file systems, and in-depth knowledge of the tooth and root canal anatomy.

Key words: Concept, Minimally invasive endodontics, Principles, Various aspects of new concept

INTRODUCTION

The goals of successful endodontic treatments are to eliminate all organic substrates from the complex root canal system, and filling the root canal system. In the context of current endodontic development, for proper cleaning and shaping, for promoting the long-term health of supporting structure of a tooth well shape canal is needed.


Minimally invasive endodontics (MIE) is a concept of maximum preserve the healthy coronal, cervical and radicular tooth structure during the endodontic treatment. For success, the dentist must aware between conservation and elimination of tooth structure during endodontic procedure to fulfill the endodontic goals.

Dr. Herb Schilder, in 1974, precisely described the mechanical objectives for the preparation of a canal that,

when filled, would ensure the biological goals for long-term success. However, these objectives were published way before any proposal of the most contemporary concepts of minimally invasive dentistry and, more recently, MIE.

Predictability of success in endodontics is currently hie on preparing the access cavity shaping, cleaning, and filling root canal systems. Going forward, the question that should be scientifically answered is, how conservatively can be prepared any given access cavity or root canal, and most importantly - still enable the root canal system to be both 3D cleaned and filled? Until, this question is answered by collaborative research, it would be better to continue to practice utilizing the most proven treatment concepts and techniques. There is an old saying, "Model success. Success leaves clues" Long-term endodontic treatment success must integrate respect for the concept of MIE while fulfilling treatment objectives by mechanically and biologically

MIE refers to the minimally removal of dentin during the all three phases of a root canal procedure: (1) Coronal access preparation; (2) radicular apical preparation; and (3) flaring of the canal that connects the coronal to the apical preparations.¹ To achieve these dental surgeons must develop new skills and dexterity

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Minimally Invasive Endodontics A Promising Future Concept

**Ranieri Cancedda, J. Mary
Murphy, Martijn van Griensven**



Minimally Invasive Endodontics A Promising Future Concept:

Minimally Invasive Approaches in Endodontic Practice Gianluca Plotino, 2020-10-05 This book describes the latest minimally invasive approaches in endodontics and explains the principles that guide them The advantages and limitations of these approaches are critically analyzed with the intention of defining new endodontic gold standards The trend toward the use of more conservative procedures within endodontics reflects the wider adoption of minimally invasive dentistry in general and is being fostered by the introduction of new materials devices instruments and techniques as well as the use of magnification and advanced three dimensional diagnostic imaging technologies In this book readers will find clear explanation of these advances and their impacts Minimally invasive access to the root canal system is described and detailed attention is devoted to the application of novel strategies in root canal instrumentation and disinfection root canal filling coronal restoration retreatment and endodontic surgery Minimally invasive alternatives to complete endodontic treatment such as vital pulp therapies and to dental extraction and implant placement including surgical extrusion intentional replantation and tooth autotransplantation are also discussed Minimally Invasive Approaches in Endodontic Practice will be of value for endodontists at all levels of experience

Insights in Tissue Engineering and Regenerative Medicine 2021: Novel Developments, Current Challenges, and Future Perspectives Ranieri Cancedda, J. Mary Murphy, Martijn van Griensven, 2023-02-15

Endodontic-Periodontal Lesions Igor Tsesis, Carlos E. Nemcovsky, Joseph Nissan, Eyal Rosen, 2019-03-12 This book presents a multidisciplinary evidence based approach to the management of teeth with lesions of endodontic periodontal origin The book opens by addressing the etiology and classification of endodontic periodontal lesions and demonstrates its relevance to the daily practice Specific endodontic prosthetic and periodontal considerations that should be incorporated into clinical decision making and treatment planning are then discussed in detail Subsequent chapters describe modern clinical procedures in periodontal regenerative treatment describe vertical root fractures as an endodontic periodontal lesion examine treatment alternatives following the extraction of teeth with endodontic periodontal lesions and discuss possible biological complications in implant supported oral rehabilitation Finally a summary chapter considers the integration of clinical factors and patient values into clinical decision making The text is accompanied by many figures presenting informative clinical examples The authors are internationally renowned scientists and clinicians from the specialties of Endodontology Periodontology and Oral Rehabilitation Owing to its multidisciplinary and comprehensive nature the book will be relevant and interesting to the entire dental community

Medicine and Health Sciences Researches
Şebnem YILDIRIMCAN KADIÇEŞME, Ali Erdinç YALIN, Serap YALIN, Orcun AVSAR, Tugba TURK, Zeynep Afra AKBIYIK AZ, Buse Başak FEYİZOĞLU, Abdullah Talha ŞİMŞEK, Semra AĞIRBAŞ, Yaser Said ÇETİN, Adem AZ, Sultan Mehtap BÜYÜKER, İbrahim BAHÇEKAPILI, Tuğba PESEN, Meryem ALBAYRAK, Md. Shah AMRAN, Mehmet BERKÖZ, Ayşe Sanem ŞAHLI, Tülin Yıldız, Çağla Avcu, Gülfem Ezgi ÖZALTIN, Dilan DEMİRTAŞ KARAÖBA, Havva ADLI, Tuba MADEN, Sedat YİĞİT, 2023-12-24

Medicine and Health Sciences Researches **Digitization in Dentistry** Priyanka Jain, Mansi Gupta, 2021-02-18 This book provides evidence based guidance on the clinical applications of digital dentistry that is the use of dental technologies or devices that incorporate digital or computer controlled components for the performance of dental procedures Readers will find practically oriented information on the digital procedures currently in use in various fields of dental practice including for example diagnosis and treatment planning oral radiography endodontics orthodontics implant dentistry and esthetic dentistry The aim is to equip practitioners with the knowledge required in order to enhance their daily practice To this end a problem solving approach is adopted with emphasis on key concepts and presentation of details in a sequential and easy to follow manner Clear recommendations are set out and helpful tips and tricks are highlighted The book is written in a very readable style and is richly illustrated Whenever appropriate information is presented in tabular form to provide a ready overview of answers to frequent doubts and questions *Digital Guided Micro Prosthodontics* Haiyang Yu, 2022-06-28 This book focuses on the clear and simplified clinical techniques for microscopic restoration dentistry With the help of microscope and hole reference technique HRT dentists can design the dimensional relationship and carry it out in preparation precisely Authors firstly introduce an overview and surgical microscope and auxiliary instruments In the second part there are 4 techniques shown in each chapter Minimally Invasive Dentistry Aylin Baysan, Paul Anderson, 2025-07-29 A helpful introduction to the Minimally Invasive Dentistry concept for patient care in the treatment of dental disease Minimally Invasive Dentistry provides a practical introduction to holistic patient care across all the dental specialties Beginning with the definitions and key principles of MID the following chapters focus on the concepts of MID including saliva as a natural product risk assessments the early detection of diseases management of dental caries futuristic materials innovative techniques and the implementation of preventative strategies with health education for patients In this way this book offers a comprehensive and evidence based look at this important branch of dentistry Minimally Invasive Dentistry readers will also find A unique approach to minimally invasive dentistry across all dental disciplines A companion website with case studies and interactive MCQs to test your knowledge Coverage of MID factors in the prevention control and treatment of disease Edited by leading figures and with contributions from a diverse group of international authors Minimally Invasive Dentistry is a useful reference for undergraduate and postgraduate dental students It is also a practical guide for the whole dental team

Nanotechnology in Endodontics Anil Kishen, 2015-03-18 This book provides detailed information on the emerging applications of nanomaterials and nanoparticles within endodontics highlighting the exciting potential clinical impact of nanotechnology in the field The range of applications covered is diverse encompassing drug and gene delivery tissue engineering antibacterial strategies dentin tissue stabilization dentin pulp regeneration and use in restorative and endodontic materials Important scientific background information relating to each application is provided with clear coverage of basic principles In addition potential pitfalls are identified and explained The cytotoxicity of nanomaterials and

nanoparticles is also addressed in a separate chapter The book will be of value both for endodontic practitioners and for all scientists and graduate students who are interested in the application of nanotechnology in endodontics *Current Therapy in Endodontics* Priyanka Jain,2016-08-08 Dentistry has been undergoing enormous changes and the field of endodontics has certainly been at the forefront Recent advances in technology materials and equipment have changed the way endodontics is practiced today thereby facilitating treatments with greater efficiency precision and success ultimately leading to better outcomes Current Therapy in Endodontics encompasses the recent discoveries and applications for this field in one clinically relevant volume Evidence based presentation of recent advances in the field of endodontics Objective comparison of materials and instruments on the market Tables present key data and instruction for quick viewing and comprehension

Endodontics Arnaldo Castellucci, MD,2022-12-13T00:00:00+01:00 The 2022 edition of Endodontics is a masterpiece The book captures the endodontics of the past the endodontics of now its trends and the endodontics of the future Illustrates the changes in endodontic technologies from evolutionary history to the preparation of a correct access cavity cleaning and shaping and 3D filling from interdisciplinary endodontics to post endodontic restoration no detail comes up omitted in describing treatment methods necessary for clinical success Volume I sets the stage by laying the foundation of the endodontic discipline and enables the reader to understand literally every current endodontic Cleaning and Shaping method with superb illustrations covering every technique detail Volume II shows the Obturation method and focus into what matters in endodontics complete in a way that the reader can easily grasp and immediately apply to their practice Diagnosis cleansing and shaping and subsequently the three dimensional obturation of the root canals are the most critical aspects of endodontics The chapters dedicated to these topics are exhaustive as well as the chapter on endoparodontal relationships and on the influence that the two pathologies have on each other The orthograde and surgical retreatments chapters make the text still more current and practical as well as the new chapters on three dimensional radiology and on pulp regeneration The work is also completed by 77 videos presenting clinical cases very significant available on <http://castellucciendodontics.edizioniedra.com> **Pitt Ford's Problem-Based Learning in Endodontology** Elizabeth Shin Perry,Shanon Patel,Shalini Kanagasingham,Samantha Hamer,2024-05-14 Pitt Ford s Problem Based Learning in Endodontology Pitt Ford s Problem Based Learning in Endodontology 2nd Edition is an essential reference for Endodontology enriched with the latest research and clinical evidence Employing a problem based approach it consolidates readers knowledge and diagnostic skills Prepared by an international team of clinical academics this edition reflects the latest advances in the field Encouraging self directed learning the authors present diverse clinical cases covering topics such as non odontogenic pain pulp preservation endodontic treatment restoration regenerative endodontic procedures and trauma Each section is accompanied by images as well as further reading recommendations A touchstone to key areas concerning the dental pulp and the root canal system Pitt Ford s Problem Based Learning in Endodontology is a valuable resource for dental students residents and clinicians seeking

the latest techniques and procedures in Endodontology **Handbook of Neuroengineering** Nitish V. Thakor, 2023-02-02

This Handbook serves as an authoritative reference book in the field of Neuroengineering. Neuroengineering is a very exciting field that is rapidly getting established as core subject matter for research and education. The Neuroengineering field has also produced an impressive array of industry products and clinical applications. It also serves as a reference book for graduate students, research scholars, and teachers. Selected sections or a compendium of chapters may be used as reference book for a one or two semester graduate course in Biomedical Engineering. Some academicians will construct a textbook out of selected sections or chapters. The Handbook is also meant as a state of the art volume for researchers. Due to its comprehensive coverage, researchers in one field covered by a certain section of the Handbook would find other sections valuable sources of cross reference for information and fertilization of interdisciplinary ideas. Industry researchers as well as clinicians using neurotechnologies will find the Handbook a single source for foundation and state of the art applications in the field of Neuroengineering. Regulatory agencies, entrepreneurs, investors, and legal experts can use the Handbook as a reference for their professional work as well.

Concise Conservative Dentistry and Endodontics- E Book Ruchi Gupta, Jayshree Hegde, Vijay Prakash, A Sirekha, 2019-05-30

Concise Conservative dentistry and Endodontics is a comprehensive book covering the entire syllabus prescribed by Dental Council of India (DCI). It is written in easy to understand format which is enriched with numerous line diagrams, tables, and highlighted text for conservative dentistry and endodontics. Contains 49 chapters under 2 sections covering basic topics, specialized materials, and techniques used in Conservative dentistry and Endodontics. Includes latest topics like Minimal Interventional dentistry and Evidence based dentistry. In each chapter, certain text is highlighted in boxes for better understanding. Contains high quality illustrations, tables, line diagrams, and flowcharts. For self assessment, a question bank is provided in the end to prepare students for various examinations.

Endodontic Materials in Clinical Practice Josette Camilleri, 2021-03-16

Endodontic Materials in Clinical Practice delivers a much needed comprehensive and clinically oriented reference to the materials used in endodontic practice. It provides complete details on the properties of the materials required for specific techniques in order to help in the selection of the appropriate materials and improve patient outcomes. Comprehensive in scope and filled with helpful illustrations, the book covers endodontic materials used from the pulp to the root end. In addition, the text considers the location and technique for each of the materials presented. Designed to be a practical and accessible reference, the book is organized by specific clinical procedure. Presents an illustrated guide to all materials used in endodontic practice. Focuses on the clinical application for each material. Explains why specific materials are used. Includes information on how to select the correct material. Considers locations and techniques in making material decisions. Written for specialist endodontists and residents, dental material specialists, post graduate students, general dentists, and dentistry students. Endodontic Materials in Clinical Practice is an essential resource for selecting the right materials for specific

techniques

Contemporary Endodontics for Children and Adolescents Anna B. Fuks, Moti Moskovitz, Nili

Tickotsky, 2023-03-22 This book equips dental practitioners with all the information required in order to ensure successful endodontic treatment of children and adolescents. It describes pulp therapy from a holistic approach that highlights new developments in the field. Readers will find updates on the formation, structure, and function of the dental pulp revealed by the latest single-cell technologies and discussions on carious lesions and their impact on the pulp. The book examines clinical considerations in the decision to perform pulp treatment and emphasizes the need to integrate pulpal diagnostics with patient-dependent factors such as behavior management and pulpal pain mechanisms. The second part of the book includes comprehensive descriptions of current treatments for each type of caries-inflicted tooth damage: from selective caries removal through direct pulp capping, pulpotomy, pulpectomy, and root canal therapy for primary dentition to direct pulp capping and endodontic treatment of young permanent teeth. Traditional and new pulp treatment materials are described as are the techniques and materials used to restore both primary and young permanent teeth. The book summarizes innovative biological approaches for pulp regeneration such as the use of stem cells. It is a must-have for dental students, endodontists, pediatric dentists, and general dentists with an interest in the subject. *3D Imaging in Endodontics* Mohamed I.

Fayad, Bradford R. Johnson, 2023-07-26 This book, now in an extensively revised second edition, is designed to provide the reader with a full understanding of the role of cone beam computed tomography (CBCT) in helping to solve many of the most challenging problems in endodontics. It will shorten the learning curve in application of this exciting imaging technology in a variety of contexts: difficult diagnostic cases, treatment planning, evaluation of internal tooth anatomy prior to root canal therapy, nonsurgical and surgical treatments, early detection and treatment of resorptive defects, and outcomes assessment. The ability to obtain an accurate 3D representation of a tooth and the surrounding structures by means of noninvasive CBCT imaging is changing the approach to clinical decision making in endodontics. Clinicians long accustomed to working in very small three-dimensional spaces are no longer constrained by the limitations of two-dimensional imaging. The challenges of mastering the new technology can, however, be daunting. The detailed guidance contained in this book will help endodontists to take full advantage of the important benefits offered by CBCT. **Nickel-Titanium Materials** Yoshiaki Oshida, Toshihiko

Tominaga, 2020-08-24 Nickel-Titanium alloys are smart materials exhibiting unique properties such as superelasticity and shape memory effect. The material has been used as orthodontic wires in the dental field for over 20 years. This book is a comprehensive overview to the field of Ni-Ti materials and the physical, chemical, and mechanical properties of this versatile alloy. In addition, complications and challenges exhibited in applications are also discussed. **Horizontal Alveolar Ridge**

Augmentation in Implant Dentistry Len Tolstunov, 2015-12-14 **Horizontal Augmentation of the Alveolar Ridge in Implant Dentistry: A Surgical Manual** presents the four main methods of horizontal ridge augmentation in a clinically focused surgical manual. After an introductory section and requirements for dental implants, sections are devoted to each procedure: ridge split

intraoral onlay block bone grafting guided bone regeneration and horizontal distraction osteogenesis Chapters written by international experts in each augmentation procedure Step by step instruction for each technique More than 1 100 clinical photographs and illustrations **Sturdevant's Art & Science of Operative Dentistry - E-Book** Andre V.

Ritter,2025-01-20 Selected for 2025 Doody's Core Titles in Dentistry Get a better picture of operative dentistry from the most complete text on the market Using a heavily illustrated step by step approach Sturdevant's Art and Science of Operative Dentistry Eighth Edition helps you master the fundamentals and procedures of restorative and preventive dentistry and learn to make informed decisions to solve patient needs Drawing from both theory and practice and supported by extensive clinical and laboratory research this edition features a new chapter on endodontics an enhanced art program and an enhanced ebook included with every new print purchase that includes supplemental chapters procedure videos and more It's the practicing dentist's complete guide to all aspects of operative dentistry NEW Chapter addresses Endodontics Applied to Operative Dentistry UPDATED Expanded art program includes more color images in the technically focused chapters to clarify essential concepts NEW Enhanced ebook version included with every new print purchase features supplemental chapters and procedure videos plus access to all the text figures and references with the ability to search customize content make notes and highlights and have content read aloud Complete guidance for all aspects of operative dentistry provides a thorough understanding of caries and an authoritative approach to treatment and prevention Emphasis on treating the underlying causes of patient problems goes beyond just restoring damage that has occurred Evidence based approach is supported by extensive clinical and laboratory research Illustrated step by step approach supports the learning of conservative restorative and preventive dentistry **Dental Economics** ,2006

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