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OCT; 3.3.3 OCT in Dentistry; 3.4 Coherent Anti-Stokes Raman Scattering (CARS) and Modulated Imaging (MI)
3.5 Fluorescence Contrast Enhancement; 3.6 Concluding Remarks; Chapter 4 Spectroscopy; 4.1 Introduction; 4.2 Molecular Orbitals and Transitions; 4.3 Transition Dipole Moment; 4.4 Spin Selection Rule; 4.5 Franck-Condon Principle; 4.6 Jablonski Diagram; 4.7 Stokes Shift; 4.8 Spectrophotometry; 4.9 Fluorescence Intensity and Lifetime; 4.10 Spectrofluorimetry; 4.11 Fluorescence Quenching; 4.12 Fluorescence Resonance Energy Transfer (FRET); 4.13 Fourier Transform Infrared (FTIR) Spectroscopy; 4.14 Concluding Remarks; Chapter 5 Lasers and Laser Tissue Interaction; 5.1 Introduction; 5.2 Laser Basics
5.2.1 Characteristics of Lasers; 5.3 Light Propagation in Tissue; 5.4 Optical Imaging and Diagnosis; 5.4.1 Optical Imaging; 5.4.2 Optical Spectroscopic Diagnosis; 5.5 Optical Processing of Tissue; 5.5.1 Photothermal Effects; 5.5.2 Photomechanical Effects; 5.5.3 Photochemical Effects; 5.5.4 Applications of Laser Processing of Tissue; 5.6 Concluding Remarks; Chapter 6 Mechanisms and Applications of Photodynamic Therapy; 6.1 Historical Background; 6.2 Photosensitizers; 6.3 Light Applicators; 6.4 PDT Mechanisms; 6.4.1 Photophysics and Photochemistry; 6.4.2 Biological Effect; 6.5 PDT Dosimetry
6.6 Progress in Clinical Application; 6.6.1 Non-Malignant Diseases; 6.6.2 Malignant Diseases; 6.7 PDT in Dentistry; 6.7.1 Technical Challenges; 6.7.2 Current Status; 6.8 Concluding Remarks; APPLICATIONS; Chapter 7 Dental Photo-Biomechanics; 7.1 Introduction; 7.2 Photoelasticity; 7.2.1 Introduction; 7.2.2 Photoelastic Models; 7.2.3 Polariscope; 7.2.4 Photoelastic Fringe Analysis; 7.2.5 Applications of Photoelasticity in Dentistry; 7.3 Moire Interferometry; 7.3.1 Introduction; 7.3.2 Specimen Grating and Moire Interferometer; 7.3.3 Applications of Moire Technique in Dentistry; 7.4 Electronic Speckle Pattern Correlation Interferometry

Sommario/riassunto

Biophotonics in dentistry is a rapidly growing area. Unlike other books, this invaluable compendium touches on the fundamental areas in biophotonics. Contributed by world-renowned authors, it provides a basic understanding on a range of topics for individuals of different backgrounds to acquire a minimum knowledge of research and development in biophotonics. The chapters are arranged in two major categories. The first describes the fundamental aspects of photonics, such as photomechanics, biomedical imaging, lasers and laser-tissue interaction, spectroscopy and photodynamic therapy. The second details the applications of biophotonics, with special relevance to dentistry, including dental photobiomechanics, Raman spectroscopy and dental tissue optics