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| Nota di contenuto | BIOPHYSICAL BONE BEHAVIOR: PRINCIPLES AND APPLICATIONS; Contents; Preface; Acknowledgements; About the Book; 1 Elements of Bone Biophysics; 1.1 Introduction; 1.2 Structural Aspect of Bone; 1.2.1 Elementary Constituents of Bone; 1.2.2 The Fibers; 1.2.3 Collagen Synthesis; 1.2.4 Bone Matrix (Inorganic Component); 1.3 Classification of Bone Tissues; 1.3.1 Compact Bone; 1.3.2 Fine Cancellous Bone; 1.3.3 Coarse Cancellous Bone; 1.4 Lamellation; 1.4.1 The Cement; 1.5 Role of Bone Water; 1.6 Bone Metabolism; 1.6.1 Ca and P Metabolism; 1.7 Osteoporosis; 1.8 Bone Cells; 1.8.1 Osteoblasts 1.8.2 Osteoblast Differentiation 1.8.3 Osteoclast; 1.8.4 Osteoclast Differentiation; 1.8.5 The Osteocytes; 1.8.6 Mathematical Formulation; 1.9 Bone Remodeling; 1.10 Biochemical Markers of Bone and Collagen; 1.11 Summary; 2 Piezoelectricity in Bone; 2.1 Introduction; 2.2 Piezoelectric Effect; 2.2.1 Properties Relating to Piezoelectricity; 2.3 Physical Concept of Piezoelectricity; 2.3.1 Piezoelectric Theory; 2.4 Sound Propagated in a Piezoelectric Medium; 2.5 Equivalent Single-Crystal Structure of Bone; 2.6 Piezoelectric Properties of Dry Compact |

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2.6.1 Piezoelectric Properties of Dry and Wet Collagens 2.6.2 Measurement of Piezoelectricity in Bone; 2.7 Bone Structure and Piezoelectric Properties; 2.8 Piezoelectric Transducers; 2.8.1 Transducer Vibration; 2.8.2 Transverse-Effect Transducer; 2.9 Ferroelectricity in Bone; 2.9.1 Experimental Details; 2.10 Two-Phase Mineral-Filled Plastic Composites; 2.10.1 Material Properties; 2.10.2 Bone Mechanical Properties; 2.11 Mechanical Properties of Cancellous Bone: Microscopic View; 2.12 Ultrasound and Bone Behavior; 2.12.1 Biochemical Coupling; 2.13 Traveling Wave Characteristics 2.14 Viscoelasticity in Bone 2.15 Discussion; 3 Bioelectric Phenomena in Bone; 3.1 Macroscopic Stress-Generated Potentials of Moist Bone; 3.2 Mechanism of Biopotential Generation; 3.3 Stress-Generated Potentials (SGPs) in Bone; 3.4 Streaming Potentials and Currents of Normal Cortical Bone: Macroscopic Approach; 3.4.1 Streaming Potential and Current Dependence on Bone Structure and Composition: Macroscopic View; 3.5 Microscopic Potentials and Models of SP Generation in Bone; 3.6 Stress-Generated Fields of Trabecular Bone; 3.7 Biopotential and Electrostimulation in Bone 3.7.1 Electrode Implantation 3.7.2 Control Data; 3.7.3 Pulsating Fields; 3.7.4 DC Stimulation; 3.7.5 Electromagnetic Field (50 Hz) Stimulation Along with Radio Frequency Field Coupling; 3.7.6 Continuous Fields; 3.7.7 Impedance Measurements; 3.8 Origin of Various Bioelectric Potentials in Bone; 4 Solid State Bone Behavior; 4.1 Introduction; 4.2 Electrical Conduction in Bone; 4.2.1 Bone as a Semiconductor; 4.2.2 Bone Dielectric Properties; 4.3 Microwave Conductivity in Bone; 4.4 Electret Phenomena; 4.4.1 Thermo Electret; 4.4.2 Electro Electret; 4.4.3 Magneto Electret; 4.5 Hall Effect in Bone 4.5.1 Hall Effect, Hall Mobility and Drift Mobility

Sommario/riassunto

Biophysical Bone Behaviour: Principles and Applications is the culmination of efforts to relate the biophysical phenomena in bone to bone growth and electrical behavior. Behari develops a bridge between physics and biology of bone leading to its clinical applications, primarily electro stimulations in fracture healing and osteoporosis. The book is based upon authors own research work and his review articles in the area, and updated with the latest research results. The first book dedicated to biophysical bone behavior Develops the relationship between the biophysics and biolo
