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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
