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Autore	Kameo Yoshitaka
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Collana	Frontiers of Biomechanics, , 2199-8515 ; ; 2
Disciplina	610.28
Soggetti	Biomedical engineering Orthopedics Biomathematics Biophysics Regenerative medicine Tissue engineering Computer simulation Biomedical Engineering and Bioengineering Physiological, Cellular and Medical Topics Biological and Medical Physics, Biophysics Regenerative Medicine/Tissue Engineering Simulation and Modeling
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Overview: In Silico Approaches to Understand Bone Adaptation -- Microscopic Fluid Flow Analysis in an Osteocyte Canaliculus -- Macroscopic Fluid Flow Analysis in a Poroelastic Trabecula -- Estimation of Bone Permeability for Poroelastic Analysis -- Modeling Trabecular Bone Adaptation Induced by Flow Stimuli to Osteocytes -- Effects of Local Bending Load on Trabecular Bone Adaptation -- Cancellous Bone Adaptation Predicted by Remodeling Simulations -- Trabecular Surface Remodeling toward Uniform Local Stress State -- Spatial and Temporal Regulation of Cancellous Bone Structure by Trabecular Surface Remodeling -- Comparison of Mechanical

Quantities as Bone Remodeling Stimuli -- Trabecular Surface Remodeling Simulation of Cancellous Bone Using Image-Based Voxel Finite Element Models -- Functional Adaptation of Cancellous Bone in Human Proximal Femur -- 3D Trabecular Remodeling in Human Proximal Femur: Approach to Understanding Wolff's Law -- Trabecular Structural Changes in a Vertebral Body with a Fixation Screw.

Sommario/riassunto

This book focuses on the systems biomechanics of bone remodeling that provide a multiscale platform for bone adaptation, spanning the cellular, tissue, and organ levels. The mathematical model explained in each section provides concrete examples of in silico approaches for bone adaptation. It will be immensely useful for readers interested in bone morphology and metabolism and will serve as an effective bridge connecting mechanics, cellular and molecular biology, and medical sciences. These in silico approaches towards exploring the mechanisms by which the functioning of dynamic living systems is established and maintained have potential for facilitating the efforts of graduate students and young researchers pioneering new frontiers of biomechanics.