Contents

Editors	ix
Contributors	xi
MATLAB Statement	xv

SECTION I Foot and Ankle Joint

Chapter 1	Foot Model for Investigating Foot Biomechanics and Footwear Design
	Ming Zhang, Jia Yu, Yan Cong, Yan Wang, and Jason Tak-Man Cheung
Chapter 2	Female Foot Model for High-Heeled Shoe Design
	Jia Yu, Yubo Fan, and Ming Zhang
Chapter 3	Foot and Ankle Model for Surgical Treatment
	Yan Wang and Ming Zhang
Chapter 4	First Ray Model Comparing Normal and Hallux Valgus Feet
	Duo Wai-Chi Wong, Ming Zhang, and Aaron Kam-Lun Leung
Chapter 5	Dynamic Foot Model for Impact Investigation
	Jia Yu, Duo Wai-Chi Wong, and Ming Zhang

SECTION II Knee Joint

Chapter 6	Knee Joint Model for Anterior Cruciate Ligament Reconstruction	75
	Jie Yao, Ming Zhang, and Yubo Fan	
Chapter 7	Knee Joint Models for Kneeling Biomechanics Yuxing Wang, Yubo Fan, and Ming Zhang	83
Chapter 8	Knee Implant Model: A Sensitivity Study of Trabecular Stiffness on Periprosthetic Fracture	93
	Duo Wai-Chi Wong and Ming Zhang	

SECTION III Hip and Pelvis

Chapter 9	Femur Model for Predicting Strength and Fracture Risk	105
	He Gong, Yubo Fan, and Ming Zhang	
Chapter 10	Hip Model for Osteonecrosis	113
	Duo Wai-Chi Wong, Zhihui Pang, Jia Yu, Aaron Kam-Lun Leung, and Ming Zhang	
Chapter 11	Pelvis Model for Reconstruction with Autografted Long Bones following Hindquarter Amputation	125
	Wen-Xin Niu, Jiong Mei, Ting-Ting Tang, Yubo Fan, Ming Zhang, and Ming Ni	

SECTION IV Lower Limb for Rehabilitation

Chapter 12	Foot-Ankle-Knee Model for Foot Orthosis
	Xuan Liu, Yubo Fan, and Ming Zhang
Chapter 13	Lower Residual Limb for Prosthetic Socket Design
Chapter 14	Residual Limb Model for Osteointegration

SECTION V Spine

۰.

Chapter 15	Spine Model for Vibration Analysis	175
	Lixin Guo, Ming Zhang, and Ee-Chon Teo	
Chapter 16	Cervical Spinal Fusion and Total Disc Replacement	199
	Zhongjun Mo, Lizhen Wang, Ming Zhang, and Yubo Fan	
Chapter 17	Spine Model for Disc Replacement	
	Qi Li, Lizhen Wang, Zhongjun Mo, and Yubo Fan	
Chapter 18	Spine Model for Applications in Aviation Protection	
	Cheng-fei Du, Lizhen Wang, Ya-wei Wang, and Yubo Fan	

SECTION VI Head and Hand

Chapter 19	Head Model for Protection
	Lizhen Wang, Peng Xu, Xiaoyu Liu, Zhongjun Mo, Ming Zhang, and Yubo Fan
Chapter 20	Tooth Model in Orthodontics and Prosthodontics
	Chao Wang, Yi Zhang, Wei Yao, and Yubo Fan
Chapter 21	Eye Model and Its Application
	Xiaoyu Liu, Lizhen Wang, Deyu Li, and Yubo Fan
Chapter 22	Temporomandibular Joint Model for Asymptomatic and Dysfunctional Joints 283
	Zhan Liu, Yuan-li Zhang, Ying-li Qian, and Yubo Fan
Chapter 23	Fingertip Model for Blood Flow and Temperature
	Ying He, Hongwei Shao, Yuanliang Tang, Irina Mizeva, and Hengdi Zhang

SECTION VII Bone

Chapter 24	Micro-Finite Element Model for Bone Strength Prediction	323
	He Gong, Ming Zhang, and Ling Qin	
Chapter 25	Simulation of Osteoporotic Bone Remodeling	331
	He Gong, Yubo Fan, and Ming Zhang	
Index		343