

<<皮肤热力学与皮肤热疼痛>>

图书基本信息

书名：<<皮肤热力学与皮肤热疼痛>>

13位ISBN编号：9787030270771

10位ISBN编号：7030270770

出版时间：2010-1

出版时间：科学出版社

作者：徐峰

页数：414

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<皮肤热力学与皮肤热疼痛>>

前言

Advances in laser, microwave and similar technologies in medicine have led to recent developments of thermal treatments for disease and injury, involving skin tissue. In spite of the widespread use of thermal therapies in dermatology, they do not draw upon the detailed understanding of the biothermomechanical-neurophysiological behaviour, for none exists to date, even though each behavioural facet is somewhat established and understood. In view of this dilemma, a new research area emerges, which is the subject of this book: "Introduction to Skin Biothermomechanics and Thermal Pain". This area is highly interdisciplinary, involving the subjects of engineering, biology and neurophysiology. This book is focused on the introduction of this new research area. According to the schematic relationship between the areas involved, this book is divided into four parts: PART I. Skin bioheat transfer and thermal damage; PART II. Skin biomechanics; PART III. Skin biothermomechanics; PART IV. Skin thermal pain.

<<皮肤热力学与皮肤热疼痛>>

内容概要

Introduction to Skin Biothermomechanics and Thermal Pain introduces the study of coupled bio-thermo-mechanical and neural behavior of skin tissue in response to thermal and mechanical loads. The research in this book focuses on the theoretical modeling and experimental investigation of heated skin tissue in order to provide a predictive framework for thermal therapies of diseased tissue in clinics. Furthermore, by developing solution tools, it focuses on changes in treatment parameters leading to more effective therapies. The book is intended for researchers and scientists in Bioengineering, Heat Transfer, Mechanics, Biology and Neurophysiology, as well as clinicians.

<<皮肤热力学与皮肤热疼痛>>

书籍目录

Chapter 1 Introduction 1.1 Introduction 1.2 Skin Biothermomechanics and Thermal Pain 1.3 Outline of the Book References

Chapter 2 Skin Structure and Skin Blood Flow 2.1 Introduction 2.2 Skin Structure 2.3 Skin Blood Perfnson References PART SKIN BIOHEAT TRANSFER

Chapter 3 Skin Bioheat Transfer and Skin Thermal Damage 3.1 Introduction 3.2 Skin Bioheat Transfer 3.3 Skin Thermal Damage 3.4 Summary References

Chapter 4 Analysis of Skin Bioheat Transfer 4.1 Introduction 4.2 Skin Bioheat Transfer Analysis with Fourier Model 4.3 Skin Bioheat Transfer Analysis with Non-Fourier Models 4.4 Summary References PART SKIN BIOMECHANICS

Chapter 5 Skin Mechanical Behaviour 5.1 Introduction 5.2 Skin Behaviour under Stretch 5.3 Skin Behaviour under Compression 5.4 Skin Failure 5.5 Skin Friction References

Chapter 6 Skin Biomechanics Experiments: Measurement and Influence of Different Factors 6.1 Introduction 6.2 In Vivo Measurements 6.3 In Vitro Measurements 6.4 Influence of Different Factors 6.5 Summary References

Chapter 7 Skin Biomechanics Modeling 7.1 Introduction 7.2 Continuum Models and Phenomenological Models 7.3 Structural Models 7.4 Summary References PART SKIN BIOTHERMOMECHANICS

Chapter 8 Introduction of Skin Biothermomechanics 8.1 Introduction 8.2 Mechanism of Thermal Denaturation (Shrinkage) of Collagen 8.3 Properties Variations due to Thermal Denaturation of Collagen References

Chapter 9 Analysis of Skin Biothermomechanics 9.1 Introduction 9.2 Theoretical Analysis of Thermal Stress 9.3 Analysis with Fourier Bioheat Transfer Models 9.4 Analysis with Non-Fourier Bioheat Transfer Models 9.5 Summary 9.6 Appendix References

Chapter 10 Experimental Characterization of Skin Biothermomechanics 10.1 Introduction 10.2 Experimental Methodology 10.3 Thermal Denaturation of Collagen in Skin Tissue 10.4 Hydrothermal Tensile Tests 10.5 Hydrothermal Compressive Tests 10.6 Characterization of Skin Viscoelasticity with Static Tests 10.7 Summary and Limitations References PART SKIN THERMAL PAIN

Chapter 11 Skin Thermal Pain Mechanism 11.1 Introduction 11.2 Definition of Pain and Pain Pathways 11.3 Anatomy and Physiology of Nociceptors 11.4 Theories of Thermal Pain References

Chapter 12 Physiological Features of Pain Sensation 12.1 Introduction 12.2 Role of C and A Nociceptors 12.3 Influence of Stimulus Temperature on Pain 12.4 Influence of Nociceptors Depth 12.5 Influence of Temperature Change Rate on Pain 12.6 Temporal Summation 12.7 Influence of Stimulus Duration 12.8 Spatial Summation 12.9 Hyperalgesia and Tissue Damage 12.10 Influence of Origin of Skin (Different Part in Body) 12.11 Influence of Skin Type 12.12 Gender Difference 12.13 Influence of Age 12.14 Summary References

Chapter 13 Skin Thermal Pain Modeling 13.1 Introduction 13.2 Model of Transduction 13.3 Model of Transmission 13.4 Model of Modulation and Perception 13.5 Results and Discussion 13.6 Summary References

<<皮肤热力学与皮肤热疼痛>>

章节摘录

However, classical grips which apply a pressure on the sample ends lead to a slippage of the sample if the pressure is too low, or damage of the sample near the grips if the pressure is too high [147]. Gluing the samples to the grip can be successfully done for very thin samples. However, if samples are too thick there is shear between the fixed sample sides and the sample core, giving a complex pattern of strain in this region [159] and the inner fibers of the sample are less strained than the fibers at the surface. Despite the reduced slippage or failure of connective tissue at the clamping site, a non-uniform loading pattern may occur, with uneven fiber recruitment of the tissue under tension and the constraint on the extracellular fibers at the bounds of the sample is induced [149], which will result in low measurement precision and non-repeatability [146].

Suture Due to the drawbacks of clamping described above, many researchers have used suture [161], where a specimen is attached to loading assemblies by several continuous loops of medical suture per edge since using thin threads allow the free expanding of sample edges in the lateral direction [13], as shown in Figure 6.3. However, suturing sample edges might result in a discontinuous load transfer to the underlying fibrous network since only discrete groups of fibers within the vicinity of the suture attachment point are loaded [149].

Waldman & Lee [149] compared the dynamic biaxial mechanical response of soft biological tissue samples under suturing and clamping under the same conditions. It was found that the tissue samples appeared to be stiffer and less extensible when mechanically tested with clamped sample edges, as opposed to when tested with sutured sample edges; and suture attachment methods demonstrated minimal boundary effects where four suture attachments are sufficient to obtain uniform stress field in biaxial testing. The same results have also been obtained by Sun et al. [140], who found that there were strong boundary effects with the clamped methods, which resulted in the fact that the inner region was not fully loaded and therefore not fully stretched and makes the tissue appear to be substantially stiffer.

<<皮肤热力学与皮肤热疼痛>>

编辑推荐

《皮肤热力学与皮肤热疼痛(英文版)》由科学出版社出版。

<<皮肤热力学与皮肤热疼痛>>

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>