

应用生物力学

YIYONG SHENGWU LIXUE

双月刊 1986年6月创刊 第36卷 第5期 2021年10月出版



[期刊基本参数] CN 31-1624/R * 1986 * b * A4 * 164 * zh+en * P * ¥25.00 * 2000 * 26 * 2021-10

主管
中华人民共和国教育部
主办
上海交通大学
承办
上海交通大学医学院附属
第九人民医院
出版
《医用生物力学》编辑部
编辑部
地址 上海市制造局路 639 号
邮编 200011
电话 (021) 53315397
传真 (021) 63137020
电子邮件
shengwulixue@163.com

网址
<http://www.medbiomechanics.com>
<http://www.mechanobiology.cn>
微博
<http://weibo.com/u/2040064195>

广告部 水汶
名誉主编
戴尅戎
主编
姜宗来
常务副主编
赵杰
副主编
陈维毅 樊瑜波 齐颖新
秦岭 郑诚功

编辑部主任
于志锋
E-mail: zfyu@outlook.com
责任编辑
徐绮
E-mail: 1534340082@qq.com
英文编辑
徐绮

编辑
《医用生物力学》编辑委员会
印刷
山西同方知网印刷有限公司

国内发行
上海市报刊发行局
国外总发行
中国国际图书贸易总公司

订购
全国各地邮局
邮发代号 4-633
定价
每期:25.00元 全年 150.00元

国内统一连续出版物号
CN 31-1624/R
国际标准连续出版物号
ISSN 1004-7220
CODEN YSLIBU
©2021 年版权归《医用生物力学》编辑部所有

目次

述评

- 发展生物力学 造福人类健康——“十四五”我国生物力学
研究发展战略思考 (671)
姜宗来
主动健康中的生物力学 (676)
牛文鑫

主动健康与生物力学专栏

- 具有分区域梯度硬度结构的定制减压鞋垫设计 (679)
楚鹏飞, 谷彦颀, 王森, 陈立, 陈文明, 马昕
基于一维统计参数映射分析跑者跑步地面反作用力差异 ... (684)
梅齐昌, 相亮亮, 李建设, Justin FERNANDEZ, 顾耀东
摆幅可调型足部康复机器人的生物力学特性分析 (692)
彭晨, 卢宗兴, 姚立纲, 戴飞铭
基于 AnyBody 脑卒中患者手部抓握训练的肌肉力学特性分析
..... (698)
赵梦文, 胡志刚, 王新征, 付东辽
亚洲蹲和西方蹲的下肢关节运动学和肌肉激活比较 (705)
王凡嘉, 周晨磊, 罗丽娜, 黄尚军, 牛文鑫
痉挛型脑瘫患者功能性选择性脊神经后根切断术前后的
三维步态特征分析 (712)
张杰, 徐意涵, 林思渝, 李彩霞, 夏汶, 郑洁皎
太极拳上步弓步动作足前进角对膝关节载荷的影响及肌肉
协调收缩策略 (718)
张彦龙, 陈思, 张愉, 黄春艳
着鞋类型和步速对膝关节载荷的影响 (725)
王勇, 任慧, 汤运启, 梁雷超, 邹利民, 刘宇, 黄灵燕

论著

- 基于可行方向法的脂肪组织本构模型参数反求优化 (732)
崔世海, 王恒宽, 李海岩, 贺丽娟, 吕文乐
多层裸支架植入主动脉夹层的流固耦合数值模拟 (738)
冯凌波, 孙翠茹, 戴向晨, 刘浩飞
人体主动脉瓣膜钙化组织的力学性质 (747)
杨贤达, 冯文韬, 刘琨, 张海波, 姚杰, 冯成龙, 王丽珍, 樊瑜波

主动脉夹层近心端不同破口形态下的血流动力学分析	(751)
薛昱, 韩青松, 巩勇智, 包桂珍, 郭世杰, 冯海全, 王晓天, 韦炜	
新型与传统锁定加压接骨板固定股骨干骨折的生物力学比较	(757)
李甜甜, 李世芸, 熊鹰, 马勇, 陈洪亮	
预期条件下不同侧切角度膝关节应力状态的有限元分析	(762)
潘正晔, 马勇, 耿治中, 蔺世杰, 郑伟涛	
内镜柔性器械腱鞘传动模型及实验研究	(769)
艾辽元, 潘贞, 于锡潼, 宋成利	
具有多孔和支撑结构的修复体重建下颌骨节段性缺损的生物力学研究	(776)
郭芳, 黄硕, 刘宁, 薛洋, 胡敏, 刘昌奎	
基于单向流固耦合方法的循环肿瘤细胞捕获特性仿真与分析	(783)
王检耀, 庄淳, 齐世霖, 王鸿东	
基于射频能量的肠道组织焊接研究	(790)
胡钟欣, 宗乃馨, 宋成利, 周宇, 涂良勇, 毛琳	
不同鞋条件对后跟着地跑者跟腱负荷特征的影响	(797)
张希妮, 邓力勤, 肖松林, 杨洋, 傅维杰	
羽毛球运动员足踝落地瞬间生物力学特征与运动风险分析	(805)
赵文悦, 孟庆华, 鲍春雨	

综 述

晚期糖基化终末产物对骨组织生物力学影响的研究进展	(811)
毛岩, 杨肖, 孙联文	
信号转导与转录活化因子 3 在骨稳态和机械力介导骨重建中的作用机制	(818)
崔怡雯, 王紫璐, 李蔚绮, 成应琪, 叶之韵, 龚心仪, 周巴入, 杨屹羚, 江凌勇	
载荷作用下骨细胞分泌因子对成骨细胞和破骨细胞的调节	(824)
杨焕, 韩标, 郭勇	
颈椎解剖与钛质网笼生物力学研究进展	(829)
郭川, 刘庆鹏	

信 息

《医用生物力学》入编 2020 年版《中文核心要目总览》.....	(711)
致读者	(761) (789)

《医用生物力学》杂志由中华人民共和国教育部主管、上海交通大学主办, 所发表之图文、版权(含翻译权)均归《医用生物力学》编辑部(出版人)所有。未经出版人书面许可, 不得对本刊内容进行任何目的和形式的转载、转播及复制, 包括转换成用于资料信息处理设施的机械、电子语言。

本刊实行通讯作者负责制, 每篇论文均由 2~3 位同行评委(peer reviewer)独立审稿。发表的图文中所表达的任何内容与观点, 均属作者个人的见解与意见, 并不反映和代表《医用生物力学》编辑部的立场和观点。有关所发表文章的任何问题, 均由作者负责解释, 出版人不承担任何与之相关的责任。

本刊是中国科技核心期刊, 已被北京大学图书馆《中文核心期刊要目总览》、《中国科学引文数据库》、荷兰《文摘与引文数据库》等国内外多家知名数据库收录。

本杂志采用无酸纸(acid-free)印刷。

JOURNAL OF MEDICAL BIOMECHANICS

Published Bimonthly

Founded in June, 1986

Volume 36 Number 5, Oct. 2021

[Journal Basic Information] CN 31-1624/R * 1986 * b * A4 * 164 * zh+en * P * ¥25.00 * 2000 * 26 * 2021-10

Supervised by

Ministry of Education of
People's Republic of China

Sponsored by

Shanghai Jiao Tong University

Organized by

Shanghai Ninth People's Hospital,
Shanghai Jiao Tong University
School of Medicine

Published by

Editorial Office of
Journal of Medical Biomechanics

Editorial Office

No. 639 Zhizaoju Rd.,
Shanghai 200011, China
Tel: + 86 21 53315397
Fax: + 86 21 63137020
E-mail: shengwulixue@163.com
Website:

<http://www.medbiomechanics.com>

<http://www.mechanobiology.cn>

Microblog:

<http://weibo.com/u/2040064195>

Advertising division: SHUI Wen

Honorary Editor-in-Chief

DAI Kerong

Editor-in-Chief

JIANG Zonglai

Executive Vice Editor-in-Chief

ZHAO Jie

Associate Editors-in-Chief

CHEN Weiyi CHENG Chengkung
FAN Yubo QI Yingxin QIN Ling

Editorial Director

YU Zhifeng

E-mail: zfyu@outlook.com

Executive Editor

XU Qi

E-mail: 1534340082@qq.com

English Editor

XU Qi

Edited by

Editorial Board of
Journal of Medical Biomechanics

Printed by

Shanxi Tongfang Knowledge Network
Printing Co., Ltd.

Overseas Distributor

China International Book
Trading Cooperation

China Standard Serial Numbering

ISSN 1004-7220

CN 31-1624/R

CODEN YSLIBU

Subscription

Yearly Subscription Rates: 150.00 RMB

Single Issue: 25.00 RMB

Copyright © 2021 by the Editorial

Board of *Journal of Medical Biomechanics*

Contents

Invited Reviews

- Develop Biomechanics, Benefit Human Health; Pondering on the
Development Strategy of Biomechanical Researches during the 14th
Five-Year Plan in China (671)
JIANG Zonglai
Biomechanics in Active Health (676)
NIU Wenxin

Special Column on Active Health and Biomechanics

- Design of Customized Decompression Insole with Zonal Gradient
Hardness Structure (679)
CHU Pengfei, GU Yanjie, WANG Sen, CHEN Li, CHEN Wenming, MA Xin
Analysis of Ground Reaction Forces during Running Based on
One-Dimensional Statistical Parametric Mapping (684)
MEI Qichang, XIANG Liangliang, LI Jianshe, Justin FERNANDEZ, GU Yaodong
Analysis on Biomechanical Properties of Foot Rehabilitation Robot
with Adjustable Swing (692)
PENG Chen, LU Zongxing, YAO Ligang, DAI Feiming
Analysis on Muscle Mechanical Properties of Stroke Patients' Hand
Grasping Training Based on AnyBody (698)
ZHAO Mengwen, HU Zhigang, WANG Xinzheng, FU Dongliao
Comparison of the Lower Limb Kinematics and Muscle Activation
Between Asian Squat and Western Squat (705)
WANG Fanjia, ZHOU Chenlei, LUO Lina, HUANG Shangjun, NIU Wenxin
Analysis of Three-Dimensional Gait Characteristics before and after FSPR
Surgery of Patients with Spastic Cerebral Palsy (712)
ZHANG Jie, XU Yihan, LIN Siyu, LI Caixia, XIA Wen, ZHENG Jiejiao
Influences of Foot Progression Angle during the Tai Chi Step Lunge
Movement on Knee Joint Load and Strategy of Coordinated
Muscle Contraction (718)
ZHANG Yanlong, CHEN Si, ZHANG Yu, HUANG Chunyan
Effects of Shoe Type and Walking Speed on Knee Joint Loads
..... (725)
WANG Yong, REN Hui, TANG Yunqi, LIANG Leichao, ZOU Limin, LIU Yu,
HUANG Lingyan

Original Articles

- Reverse and Optimization for Constitutive Parameters of Adipose
Tissues Based on Feasible Direction Method (732)
CUI Shihai, WANG Hengkuan, LI Haiyan, HE Lijuan, LÜ Wenle
Fluid-Structure Interaction Simulation of Multiple Overlapping Uncovered Stent
Intervention in Aortic Dissection (738)
FENG Lingbo, SUN Cuiru, DAI Xiangchen, LIU Haofei

Mechanical Properties of Calcification from Human Aortic Valve	(747)
<i>YANG Xianda, FENG Wentao, LIU Kun, ZHANG Haibo, YAO Jie, FENG Chenglong, WANG Lizhen, FAN Yubo</i>	
Hemodynamic Analysis on Proximal End of the Aortic Dissection with Different Rupture Shapes	(751)
<i>XUE Yu, HAN Qingsong, GONG Yongzhi, BAO Guizhen, GUO Shijie, FENG Haiquan, WANG Xiaotian, WEI Wei</i>	
Biomechanical Comparison of Novel and Traditional LCP Fixation for Femoral Shaft Fractures	(757)
<i>LI Tiantian, LI Shiyun, XIONG Ying, MA Yong, CHEN Hongliang</i>	
Finite Element Analysis on Stress State of Knee Joint with Different Lateral Cutting Angles under Expected Conditions	(762)
<i>PAN Zhengye, MA Yong, GENG Zhizhong, LIN Shijie, ZHENG Weitao</i>	
Transmission Model of Tendon-Sheath System for Endoscopic Flexible Instrument and Experimental Study ...	(769)
<i>AI Liaoyuan, PAN Zhen, YU Xitong, SONG Chengli</i>	
Reconstruction of Segmental Mandibular Defects Restored by Prosthesis with Support and Porous Structure: A Biomechanical Study	(776)
<i>GUO Fang, HUANG Shuo, LIU Ning, XUE Yang, HU Min, LIU Changkui</i>	
Simulation and Analysis of Capture Characteristics of Circulating Tumor Cells Based on Unidirectional Fluid-Solid Interaction Method	(783)
<i>WANG Jianyao, ZHUANG Chun, QI Shifei, WANG Hongdong</i>	
Intestinal Tissue Fusion Based on Radiofrequency Energy	(790)
<i>HU Zhongxin, ZONG Naixin, SONG Chengli, ZHOU Yu, TU Liangyong, MAO Lin</i>	
Effects of Different Shoe Conditions on Achilles Tendon Loading in Runners with Habitual Rearfoot Strike Patterns	(797)
<i>ZHANG Xini, DENG Liqin, XIAO Songlin, YANG Yang, FU Weijie</i>	
Biomechanical Characteristics and Sports Risk Analysis on Foot-Ankle Joints of Badminton Players at the Moment of Landing	(805)
<i>ZHAO Wenyue, MENG Qinghua, BAO Chunyu</i>	

Review Articles

Progress in Advanced Glycation End-Products Effects on Biomechanics of Bone Tissues	(811)
<i>MAO Yan, YANG Xiao, SUN Lianwen</i>	
The Role of Signal Transducer and Activator of Transcription 3 in Bone Homeostasis and Load-Driven Bone Remodeling	(818)
<i>CUI Yiwen, WANG Zilu, LI Weiqi, CHENG Yingqi, YE Zhiyun, GONG Xinyi, ZHOU Siru, YANG Yiling, JIANG Lingyong</i>	
Regulation of Osteoblasts and Osteoclasts by Secretory Factors Derived from Osteocytes under Mechanical Loading	(824)
<i>YANG Huan, HAN Biao, GUO Yong</i>	
Recent Advances of Biomechanical Studies on Cervical Spine Anatomy and Titanium Mesh Cage	(829)
<i>GUO Chuan, LIU Qingpeng</i>	

News and Announcement

..... (711)(761)(789)

The *Journal of Medical Biomechanics* (JMB) is sponsored by Shanghai Jiao Tong University and supervised by Ministry of Education of People's Republic of China. The copyright is reserved by Editorial Office of *Journal of Medical Biomechanics*. No contents are allowed to be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the written permission from the publisher.

All manuscripts are reviewed by two or three independent expert reviewers. The information presented in the papers and the opinions expressed therein are those of the individual authors and not necessarily reflect the views of the Editorial Board of *Journal of Medical Biomechanics*. The publisher assumes no liability for any materials published in the journal. All statements are the responsibilities of the authors, particularly the corresponding author (s).

JMB is the source journal for Chinese Scientific and Technical Papers and Citations, and is selected in the *Guide to the Core Journals of China* by Peking University Library. It has been included in certain famous databases such as China Science Citation Database (CSCD) and Scopus.

This journal is printed on acid-free papers.