

Editorial

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This special issue of Technology & Health Care is called “Advances in Biomedical Engineering: Research that bridges the gap between Engineering and Medicine” and contains a collection of selected papers from the 12th International Conference BIOMDLORE 2018.

BIOMDLORE stands for **B**IOmechanics, **M**edical **D**iagnostics, **L**ocomotion and **R**ehabilitation; it is an international conference, organized by the Lithuanian Society of Biomechanics and non-profit foundation Educating Students in Engineering and Medicine (ESEM), in cooperation with Vilnius Gediminas Technical University (Lithuania) and Białystok University of Technology (Poland). The scope of the conference is focused on the various issues of biomedical engineering: Human body biomechanics, gait and posture, orthopaedics and traumatology, assistive technologies, rehabilitation engineering, medical diagnostics, biosignal processing, mathematical modelling, sports biomechanics, and robotics in healthcare. As the title of this special issue suggests, the research presented here tries to bridge the gap between engineering and medicine, raise the problems related to the healthcare and provide engineering-based solutions.

The special issue consists of nine full papers and seven technical notes that were selected among all the accepted papers by the scientific committee of the conference based on the relevance to the journal and the double-blind reviews. We would like to take this opportunity to express our gratitude to the persons and institutions that have helped organize the conference, reviewers for evaluating the articles, and all authors for submitting their work.

The contents of the special issue largely reflect the issues which are currently explored within the field of biomedical engineering and biomechanics. These issues include investigating the biomechanical properties of various soft and hard tissues, dynamics and modelling of musculo-skeletal system, development of various medical diagnostic tools, processing of biosignals, etc.

In “Effects of robot-assisted training on upper limb functional recovery during the rehabilitation of poststroke patients” and “Necessity of early-stage verticalization in patients with brain and spinal cord injuries: Preliminary study” authors aim to determine the effectiveness of robot-assisted training in the recovery of stroke and from brain and spinal cord injuries; in “Application of Zebris dynamometric platform and arch index in assessment of the longitudinal arch of the foot” authors outline the methods they have developed for the standardization of foot arch assessment; in “Investigation of the backflows and outlet boundary conditions for computations of the patient-specific aortic valve flows” authors perform a haemodynamic analysis of the aortic valve flows in order to develop the outlet boundary conditions and aim to improve convergence of the patient-specific aortic valve computations; in “A dynamic model of a device with a parallel-serial structure to support the human lower limb” authors propose a new parallel-serial structure that enables an increase of the range of rotation angles and can be fitted to an individual person; in “A pilot study on the influence of exercising on unstable training machine on balance

control and trunk muscles activity” authors evaluate the influence of the short term training on an unstable training machine on balance control and trunk muscles activity in patients with lower back pain; in “Modelling of silk-reinforced PDMS properties for soft tissue engineering applications” authors analyse the effect of mechanical load on silk-reinforced PDMS depending on silk concentration; in “Numerical simulation of transapical off-pump mitral valve repair with neochordae implantation” authors aim to evaluate the transapical mitral valve repair using finite element modelling and aim to determine the effect of the neochordal length on the function of the prolapsing mitral valve; in “The impact of body mass on spine alterations in pregnant women – a preliminary study” authors aim to determine changes in spine parameters occurring during pregnancy accompanying the increasing body gain.

The technical notes describe various approaches and methods for evaluation of myocardial coronary vessels upon the conditions of artificial blood circulation; estimation of ground reaction forces and joint moments based on plantar pressure insoles; investigation of ultrasonic tube-shaped waveguide wire intended for interventional thrombosis treatment solutions; quantified assessment of upper extremity motor function in multiple sclerosis patients; safe manual handling of luggage; novel techniques for a wireless motion capture for the monitoring and rehabilitation of disabled people for application in smart buildings; low-cost pressure distribution sensors for seating posture monitoring.

The results of the research presented in this issue are of interest to experts in engineering, medicine, rehabilitation, orthopaedics and other fields. We hope that the readers enjoy this special issue.