FOREWORD

This special issue of Engineering Transactions contains nine papers presented during the Workshop "Biomechanics of Skeletal System", held in Warsaw, May 18–19, 2001. Moreover, it includes the lectures provided elsewhere by one of the father-founders of modern bone mechanics, professor S. C. Cowin. His comprehensive article reviews the process of growth, reinforcement and resorption of bone, collectively termed remodelling, as well as the theory of adaptive elasticity developed as a model for the mechanical, load-induced adaptation of bone.

The second paper (P. Kowalczyk) presents a numerical model of the system femur-implant from the point of view of optimization of cementless implants. The model includes orthotropic properties of both the cancellous and cortical bone. Numerical modelling of the human pelvic bone, comprising its geometry and stress analysis, is studied by A. John and P. Orantek. In the next paper, a spatial mathematical model simulating dynamic behaviour of human cervical spine has been proposed (M. Gzik and D. Tejszerska). In two subsequent contributions (D. Jasińska-Choromańska and J. Deszczyński, D. Jasińska-Choromańska and I. Sadzyński), a new generation of external fixation devices has been presented (modelling, computer simulation, osteosynthesis and clinical verification). The paper by M. Stańczyk and J. J. Telega presents a comprehensive overview of the heat transfer problems in orthopaedics. Possibilities of using nonmetallic materials as biomaterials (implants) have been examined by J. Chłopek and G. Kmita. The last two papers are more specific and deal with diagnostics and treatment of damaged Achilles tendon (K. Skiba) and simple mechanical testing of human brain blood vessels pathologically changed by ageing.

All in all, the present issue covers many basic aspects of bone, orthopaedic and rehabilitation biomechanics.

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Warsaw, September 15, 2003.