

SIMULATION AND EXPERIMENTAL VALIDATION OF BONE- IMPLANT-SYSTEMS IN CLINICAL APPLICATIONS

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ABSTRACT

Personalized simulations based on patient-specific data are a relevant task in orthopaedic trauma surgery. The starting point for all individualized models are the material properties of bone given from experiments as well as from medical imaging. For the understanding of the behaviour of bone-implant-systems under realistic loading conditions, monitoring of patients is essential. In order to establish simulation-based workflow concepts into the clinical routine, besides the mechanical modelling also imaging techniques such as segmentation, material assignment and CAD integration are relevant for success. In addition, patient-specific simulation strategies are playing a key role for a personalization of osteosynthesis implants. With realistic material parameters and individual loading scenarios, an individualization of implants as well as rehabilitation processes are possible.

The main objectives of this mini-symposium are centred on bringing together engineers, mathematicians, physicist, biologists, computer scientists, experimentalists and (end)users in orthopaedic trauma surgery to discuss concepts and strategies from experiment and simulation to clinical applications. Topics of interest include, but are not restricted to, the following:

- simulation
- novel concepts in computational biomechanics
- novel aspects in (soft) tissue modelling
- novel strategies for personalized trauma implants
- applications with potential relevance for orthopaedic trauma surgery
- personalized simulations with a focus on clinical applications