

Tentative Outline

Special Issue for Neuroscience and Biomedical Engineering

(Title: Numerical and experimental research propositions on nonlinear dynamical systems for the skull-brain system)

Guest Editor: Xianfang YUE



Aims & Scope:

The function of human skull is mainly protecting the brain – the most important organ in the human body. Skull fractures are the break in cranial bone, also known as the skull, and injury, tumour invasion, or infection can cause the cranial defects. An injury to the brain can also accompany the fracture. Prolonged intracranial hypertension, a common pathway in the presentation of traumatic head injury, can lead to brain damage or even death. In addition, traumatic brain injury is an important medical problem affecting millions of people. The possible types of injuries are more likely to depend on if the dynamic material properties of skull and brain are identified. Biomechanical modeling of cranial injury and traumatic brain injury requires the formulation of complex constitutive equations, accounting for large strains, time and rate effects, and consistent damage models. Biomechanical model has been shown to play a key role in study of cranium brain, because it can be used to investigate the pathogenesis through model observation, thereby to propose the strategy of diagnosis and treatment. Mathematical modeling and computer simulations can illuminate the mechanics, but only if the parameters of the model are accurate. Viscoelastic and soft tissue, i.e. skull bone and brain, represent a significant challenge for analysis because of its lack of structural integrity. It will not only provide insight into the reaction of cranial cavity to ICP-induced loading, but also improve the accuracy of skull fracture impacts to a head determining the material properties of skull bone and brain.

Keywords:

Intracranial Pressure, Cranial Cavity, Compact Skull Bone, Cancellous Skull Bone, Interstitial Fluid, Microstructure remodeling, Mechanical Properties, Cerebral Injury, Brain

Subtopics:

The subtopics to be covered within this issue are listed below:

Please mention sub topics, along with the names, affiliations and email IDs of all authors

Sub topics:

- An investigation of the Role of Interstitial Fluid to Compact Skull Skeleton Using a Deformed Tension of Intracranial Pressure (ICP)
- Impact of pressure-induced interstitial fluid flow as a mechanical stimulus on cancellous bone for microstructure remodeling
- An experimental approach in a porcine model for the mechanical properties of cranial bone and the effect of time-to-delivery
- Prediction of the laminated skull tension with a ICP-induced interstitial fluid flow as a mechanical stimulus for microstructure remodeling
- Mechanics and Material Properties of Cranial Cavity and Brain as a Microstructure Remodelling with the ICP-induced Interstitial Fluid Flow

- The Importance of Computationally Modeling the head as the ICP-induced fluctuation for the Infant Cerebral Injury

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- ✧ Manuscript submission deadline: 30th June 2017
- ✧ Peer Review Due: 10th July 2017
- ✧ Revision Due: 31st July 2017
- ✧ Announcement of acceptance by the Guest Editors: 7th Aug 2017
- ✧ Final manuscripts due: 15th Aug 2017

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