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Bachelor Thesis

Mechanical Design of an Oedometric Testing Device for Consolidation Tests of Brain Tissue

Human brain tissue is suspected to comprise a complex porous compound of solid and liquid phase. This makes it a polyphasic material with its mechanical properties determined not only by the viscoelastic behavior, but also by the porous nature of the tissue. The aim of the ongoing D-A-CH project is therefore to characterize the mechanical response of brain tissue by developing a biphasic constitutive model, based on a comprehensive set of experimental data. The main focus of the introduced project is the development of a new experimental setup. To confidently determine porosity-related effects of human brain tissue, we are currently designing an Oedometric testing device capable of dealing with the ultra-soft nature of the material. A design specification catalogue is used as a reference for the mechanical and electrical design.

Description

The bachelor student will participate in and support the design of the prototype of the oedometric testing device. The creation of concepts for the implementation as well as the creation of CAD models and drawings are just as much a part of the tasks as the evaluation and subsequent dimensioning of the machine elements. Attention is to be paid to user-friendliness, as the device is to be used for a variety of tests. In cooperation with the supervisor, production drawings are to be created.

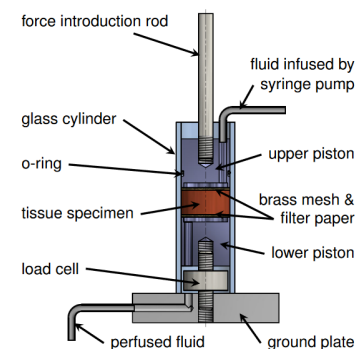


Figure 1 Schematic sketch of the Oedometric testing device

Requirements

The applicants should preferably have the following knowledge:

- Engineering background with good knowledge in dimensioning of machine components
- Knowledge in Solidworks CAD-program
- Good knowledge in English (written and spoken)

Supervisors

Dipl.-Ing. Manuel P. Kainz (Institute of Biomechanics),

Dipl.-Ing. Philipp S. Eisele (Institute of Production Engineering)