



INVESTMENTS IN EDUCATION DEVELOPMENT

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### **Inflation tests and modelling of Human Saphenous Veins**

J. Veselý, L. Horný, H. Chlup, R. Žitný

Czech Technical University in Prague, Czech Republic

[jendavesely@gmail.com](mailto:jendavesely@gmail.com)

Inflation tests of 15 human saphenous veins were conducted to obtain data suitable for multi-axial constitutive modeling at overloading conditions (pressures up to approximately 15 kPa). The data were fitted with a hyperelastic, nonlinear and anisotropic constitutive model based on the theory of the closed thick-walled tube. It was observed that initial highly deformable behavior in the pressure circumferential stretch response is followed by progressive large strain stiffening, which is in contrast to the pressure axial stretch response where the stretches remained in the range 0.98 – 1.03 during the entire pressurization in most cases. The material parameters presented here are suitable for use in simulations describing the adaptation of the autologous vein wall after bypass surgery.

### **Finite element analysis of whole human mandible**

D. Šedovičová

Czech Technical University in Prague, Czech Republic

[Darina.Sedovicova@fs.cvut.cz](mailto:Darina.Sedovicova@fs.cvut.cz)

A FEA model of human mandible was created from CT scans of young woman. It consists of the three parts – bone, periodontal ligaments and teeth. Mechanical properties of bone were found out from CT scans. It was assumed that mechanical behavior of bone is dependent on the bone density. The bone was modeled with non-homogenous structure – each finite element had various material properties. We were supposed that the bone has elasto-plastic deformation generally. The FEA model of human mandible was loaded from muscles physiologically. This model will be used to simulation of a response of bone to insert retainers.