Testing of Implant Prototype of Femoral Component Using Hydraulic Machine ZD40

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An article deals with a realization and a statistical evaluation of a pressure test using a hydraulic testing machine ZD 40 in order to determine a strength of a designed implant prototype of a femoral component, more precisely a maximal force F that breaks a material and creates a crack. It is needed to make real testing samples of the new implant prototype of the femoral component for this purpose. Four pieces of testing samples are made in cooperation with the company in Velka Bites. Because of a price and availability in a range of offered cast materials testing samples are made of a bio tolerated cobalt alloy Co-Cr-Mo that is frequently implanted to a live organism. The implant prototype of the femoral component is designed from evaluated CT data of a patient's affected knee-joint (a femur distal part, a proximal tibia part). An individual 3D model of the implant prototype of the femoral component is created on the basis of editing of gained data in software CATIA.
The created 3D model is converted to *.stl format with a high resolution. Subsequently, the shell implant of the femoral component (a master model) is made using an additive method FDM (Fused Deposition Modelling). The next production method follows – production of a ceramic mould and casting of the real implant prototype of the femoral component from the bio tolerated cobalt alloy Co-Cr-Mo.

Keywords: Knee-Joint, Implant Prototype, Femoral Component, CATIA, Hydraulic Machine

Acknowledgement

The research was supported and co-financed from the project called "Excellent young scientists at VUT University in Brno" – register number CZ.1.07/2.3.00/30.0039.

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Paper number: M201573