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Biomechanical Assessment of the Bone Ingrowth Effect During Cementless Endoprosthesis Osteointegration

A. V. Nikitsin

Belarusian State University, Republic of Belarus, 220030, Minsk, Nezavisimosti avenue, 4, andy.nik@tut.by

Finite element model of porous titanium inserts for cementless endoprosthesis was reconstructed using X-ray tomography. The stress distribution is calculated for a model with open-cell foam and composite bone / titanium. The results explain the mechanism of the porous structure destruction and positive influence of the osteointegration effect on the strength properties. Numerical calculations are confirmed by experimental data of the porous samples during compression testing. It is shown that changes in mechanical properties of porous titanium due to process of bone ingrowth is a topical area for biomechanical research.

Key words: FEA, stress-strain, osteointegration effect, X-ray tomography.

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