

عنوان مقاله:

Using Minimal Surface theory to design bone tissue scaffold and validate it with SLS 3D printer

محل انتشار:

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خلاصه مقاله:

Selective laser sintering (SLS) is a certified technology to produce porosity parts with controlled structure for regeneration hard tissue such as bone. the goal of this research is validate fabrication of tissue scaffold with SLS technology for bone. TPMS Surface is used for designing the units of scaffold. selected minimal surface is Shwartz-primitive surface. for optimizing the mechanical strength of tissue scaffold, the cell size between 3,4,5 mm with 4 different porosities has been selected. in the next step, Modeling and Simulation of the scaffolds was performed. the best scaffold for bone tissue should has mechanical strength and porosity in the range of strength and porosity of spongy bone. thus, as a result of simulation, 6 scaffolds have mechanical strength and porosity in the range of spongy bone and these scaffolds have been optimized for bone tissue. for evaluation and fabricate validation, designed scaffold was produced by SLS 3D Printer. We used biocompatible polyamide 12 (PA 12) for fabricating bone scaffold. tiny feature of scaffold was evaluated with digital microscopic and compared with designed scaffold. finally, with TPMS theory we could design and fabricate an optimized bone scaffold which has mechanical strength and porosity .in the range of cancellous bone

کلمات کلیدی:

Bone tissue scaffold, Minimal surface, Porosity, Additive Manufacturing, SLS 3D Printer

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