PROCEEDINGS

Grayscale Digital Light Processing of Graded Porous Materials for Bone Regeneration

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ABSTRACT

The regeneration of large-segment bone defects remains a significant challenge in orthopedics. Synthetic bone implants offer a promising solution; however, existing implants struggle to accurately replicate the heterogeneity and graded porosity of natural bone tissue while also failing to meet patients' individualized needs. Leveraging stereolithography-based 3D printing, we developed a halftoning grayscale 3D printing strategy for the precise fabrication of bone scaffolds with complex structures and graded porosity, closely mimicking natural bone tissue. This research focuses on optimizing both the 3D printing process and the performance of graded porous biomimetic bone scaffolds.

KEYWORDS

Stereolithography; graded porous materials; bone regeneration

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.