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Method for manufacture photocurable hydroxyapatite slurry that can be applied into stereolithography and physical evaluation according to scaffolds structure

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In this study, hydroxyapatite (HA) slurry was prepared and optimized to construct an auxetic three-dimensional (3D) scaffold for bone tissue reconstruction. The HA suspensions were divided into five groups according to their HA content. The HA 35 vol% slurry was selected with optimal flowability through rheological evaluation. This study demonstrated the applicability of an optimized HA suspension using commercially available stereolithography (SLA). Disc samples made with HA 35 vol% slurry exhibited the highest flexural strength and relative density.

Final sintered HA discs showed no cytotoxicity through cell adhesion evaluation. In addition, three supports (auxetic, circle, frame) were prepared using the optimized HA slurry. The prepared auxetic scaffold showed a 245% improvement in breaking strength compared to the circle scaffold and showed a significant difference from other types of scaffolds in osteocytes proliferation and differentiation experiments. The HA slurries proposed here are generally applicable to commercialized SLAs. This study will be helpful for future research on scaffolds including various biomaterials and designs manufactured using additive manufacturing techniques.

Biography

Jin-Ho Kang has completed B.S and M.S from the department of biomedical engineering, Inje University, Republic of Korea. He has completed his PhD at the age of 31 years from the department of prosthodontics, School of Dentistry, Chonnam National University, Republic Korea. He is a post-doctoral student of Chonnam National University, Republic Korea. Jinho Kang has researched ceramic 3D printing for many years and is focusing on medical device manufacturing research through a biomedical engineering approach.

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