

Publication**An In Vitro Study of Osteoblast Response on Fused-Filament Fabrication 3D Printed PEEK for Dental and Cranio-Maxillofacial Implants****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 4508459**Author(s)** Han, Xingting; Sharma, Neha; Xu, Zeqian; Scheideler, Lutz; Geis-Gerstorfer, Jürgen; Rupp, Frank; Thieringer, Florian M.; Spintzyk, Sebastian**Author(s) at UniBasel** [Thieringer, Florian Markus](#) ;**Year** 2019**Title** An In Vitro Study of Osteoblast Response on Fused-Filament Fabrication 3D Printed PEEK for Dental and Cranio-Maxillofacial Implants**Journal** Journal of clinical medicine**Volume** 8**Number** 6**Pages / Article-Number** 16

Polyetheretherketone (PEEK) is a prime candidate to replace metallic implants and prostheses in orthopedic, spine and cranio-maxillofacial surgeries. Fused-filament fabrication (FFF) is an economical and efficient three-dimensional (3D) printing method to fabricate PEEK implants. However, studies pertaining to the bioactivity of FFF 3D printed PEEK are still lacking. In this study, FFF 3D printed PEEK samples were fabricated and modified with polishing and grit-blasting (three alumina sizes: 50, 120, and 250 μm) to achieve varying levels of surface roughness. In vitro cellular response of a human osteosarcoma cell line (SAOS-2 osteoblasts, cell adhesion, metabolic activity, and proliferation) on different sample surfaces of untreated, polished, and grit-blasted PEEK were evaluated. The results revealed that the initial cell adhesion on different sample surfaces was similar. However, after 5 days the untreated FFF 3D printed PEEK surfaces exhibited a significant increase in cell metabolic activity and proliferation with a higher density of osteoblasts compared with the polished and grit-blasted groups (; p ; <0.05). Therefore, untreated FFF 3D printed PEEK with high surface roughness and optimal printing structures might have great potential as an appropriate alloplastic biomaterial for reconstructive cranio-maxillofacial surgeries.

Publisher Multidisciplinary Digital Publishing Institute**ISSN/ISBN** 2077-0383**URL** <https://www.mdpi.com/2077-0383/8/6/771/html>**edoc-URL** <https://edoc.unibas.ch/71086/>**Full Text on edoc** No;**Digital Object Identifier DOI** 10.3390/jcm8060771**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/31159171>**ISI-Number** WOS:000475349300015**Document type (ISI)** Article