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Abstract

Influence of sandblasting parameters on the surface properties of additive manufactured and machined titanium

O. Akbas[1*], L. Reck[1], A. Jahn[2], J. Hermsdorf [2], M. Stiesch [1], and A. Greuling [1]

[1] *Department of Prosthetic Dentistry and Biomedical Materials Science, Hannover Medical School, Hannover, Germany*
[2] *Laser Zentrum Hannover e.V., Hannover, Germany*
[*] *Corresponding author, email: Akbas.Osman@mh-hannover.de*

Sandblasting is a common process for modifying surfaces. In dentistry, sandblasting is used on titanium surfaces in combination with acid etching to create a more biocompatible environment. The purpose of this study is to investigate the impact of different sandblasting parameters on the surface roughness, contact angle and surface energy of additively manufactured TiAl6V4 and machined commercially pure titanium (cpTi) surfaces.

Using a modified sandblasting device, the sandblasting angle, sandblasting distance, and sandblasting pressure were systematically varied to analyse the effects on these surface properties.

Results show that sandblasting causes a change in surface topography as well as surface roughness. The initially rough additively manufactured TiAl6V4 samples become smoother through sandblasting, whereby the smooth cpTi surfaces are roughened after sandblasting. This effect is caused by the material removal during the sandblasting process, which is mainly influenced by the sandblasting pressure. Furthermore, sandblasted samples tend to have a more hydrophobic surface in general.

These findings underscore the need for precise control of the sandblasting parameters to achieve the desired surface properties, particularly for the integration and functionality of medical implants.

AUTHOR'S STATEMENT
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