Transactions on Additive Manufacturing Meets Medicine
Trans. AMMM, 2023, Vol. 5, No 1, Suppl. 1, Article ID 835, 1 Page

Infinite Science Publishing

Abstract

Hybrid manufacturing of medical implants

F. Lell[1,*], F. Feucht[1], A. Gotti[2]

[1] *DMG MORI Additive GmbH, Bielefeld*
[2] *Micron Tool SA, CH Agno*
[*] *Corresponding author, email: friedemann.lell@dmgmori.com*

Medical implants from Titanium alloys or pure Titanium are used since many years. Typically, these implants have been produced by conventional machining on milling centers or turn-mill centers. Years ago, the dental industry has started a hybrid process by combining LPBF technology with an additional finishing on 5 axis milling centers.

Producing hip cups by additive manufacturing has also become an industry standard over the last years. For this application, additive manufacturing has not only commercial advantages, but brings additional functionality by building porous lattice structures on the backside of the implant to improve the grow of bone into the hip cup.

New hybrid processes combine the best of conventional machining and additive manufacturing by printing complex geometries on pre milled parts. This process on the one hand allows to optimize the production process, but on the other hand requires very accurate positioning in the AM process to print on pre-machined parts. An example for this process is tibial baseplate of knee implants with high accuracy and surface finish on the upper side and lattice structure on the lower side.

Even more advanced is a three-step process chain to produce glenoid baseplates of shoulder implants by turning and milling discs with break throughs, building up a center dome and lattice structure by SLM process and finishing the part on a 5-axis milling center. This process does not only improve the functionality of the implant, but also is the most economical way compared to other processes.

AUTHOR'S STATEMENT

Authors state no conflict of interest. Conflict of interest: F. Lell and F. Feucht are emplyees of DMG MORI Additive GmbH, Bielefeld; A. Gotti ist employee of Micron Tool SA, CH Agno. Animal models: n.a. Informed consent: Informed consent has been obtained from all individuals included in this study. Ethical approval: The research related to human use complies with all the relevant national regulations, institutional policies and was performed in accordance with the tenets of the Helsinki Declaration

DOI: 10.18416/AMMM.2023.2309835