

Scientific Keynote

Bone tissue reconstruction: From cellular self-assembly to 3D (bio)printing

S. Fuchs^{1*}

¹ *Klinik für Orthopädie und Unfallchirurgie, University Clinical Center, UKSH Kiel, Germany*

* *Corresponding author, email: sabine.fuchs@uksh.de*

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Successful bone tissue reconstruction needs to consider multiple aspects ranging from the selection of biocompatible implant materials to complex biological mechanisms guiding bone tissue repair. All these factors are also essential for new additive manufacturing technologies such as 3D (bio)printing of bone constructs. So far mainly acellular material-based 3D constructs are generated by 3D printing. In this context this presentation will emphasize how 3D printing technologies can profit from the cellular interaction during bone repair and vascularization leading to self-assembly of vascularized bone tissue in 3D bone constructs. In combination with 3D manufacturing technologies such as extrusion based printing and digital light processing technologies, this will enable to generate larger complex bone constructs in the future. First steps are made in bone tissue reconstruction by bioprinting including the development of bioinks and solid bone scaffolds. However, complex technological challenges still exist and need to be addressed by interdisciplinary approaches in the future.

AUTHOR'S STATEMENT

Conflict of interest: Author state no conflict of interest. Animal models: Indicate here under which approval you have carried out animal experiments. 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, and has been approved by the authors' institutional review board or equivalent committee.