Applications of 3D printing on craniofacial bone repair

Michael Maroulakos, George Kamperos, Lobat Tayebi, Demetrios Halazonetis, Yijin Ren

Three-dimensional (3D) bioprinting, a method derived from additive manufacturing technology, is a recent and ongoing trend for the construction of 3D volumetric structures. The purpose of this systematic review is to summarize evidence from existing human and animal studies assessing the application of 3D printing on bone repair and regeneration in the craniofacial region.

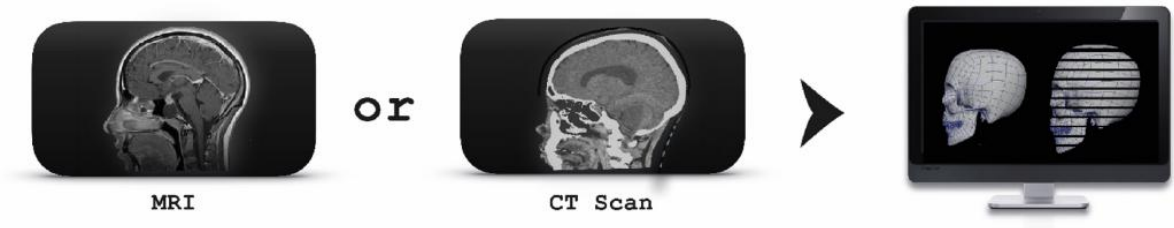
Introduction

Background

Three-dimensional (3D) bioprinting technology will play a pivotal role in medicine, offering a promising potential for bone reconstruction, rehabilitation and regeneration (1) (2).

There is a variety of terminology for describing 3D printing, including:

- additive manufacturing (AM)
- solid freeform fabrication (SFF)
- rapid prototyping (RP)



Obrázek 1: Step 1

3D printing technologies involve building a well-defined 3D structure from a computer-aided design (CAD) model using layer by layer arrays, see OBRÁZEK 1

Tabulka 1: Eligibility criteria used for the study selection

Category	Inclusion Criteria	Exclusion Criteria
Participant characteristics	Studies on human participants	Clinical trials with fewer than five participants
Intervention	Animal interventional studies with craniofacial bone defects	Bone repair using autologous bone
Comparison	Studies assessing bone repair after using 3D printed implanted biomaterials	Studies assessing bone repair by any other means of reconstruction

Data & Sources

Protocol

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Information sources and literature search strategy

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Study selection

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Data extraction

Results

Bibliography

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Table of content

Applications of 3D printing on craniofacial bone repair 1

Michael Maroulakos, George Kamperos, Lobat Tayebi, Demetrios Halazonetis, Yijin Ren 1

Introduction 1

Background 1

Data & Sources 2

Protocol 2

Information sources and literature search strategy 2

Study selection 3

Data extraction 3

Results 3

Bibliography 4