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ADVANCING FRONTIERS IN 3D BONE BIOPRINTING

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Three-dimensional (3D) bioprinting of cell-laden biomaterials has been used to fabricate tissue-engineered constructs to mimic the anatomical complexity and precise deposition of different types of cells. Bioinks used in bone bioprinting include water-swollen hydrogels loaded with bioactive ceramics and cell and growth factors. These materials facilitate the production of mineralized extracellular matrix (ECM). A critical summary of the recent advances made with various types of bioink used for bone bioprinting will be presented. Major challenges, such as the vascularity, clinically relevant size and mechanical properties of 3D printed structure that must be addressed to successfully use the technology in a clinical setting are discussed. Emerging approaches to address these problems are reviewed, and future strategies to design biomimetic 3D printed structures are proposed.

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