Bioprinted Osteon-like Scaffolds Enhance in Vivo Neovascularization

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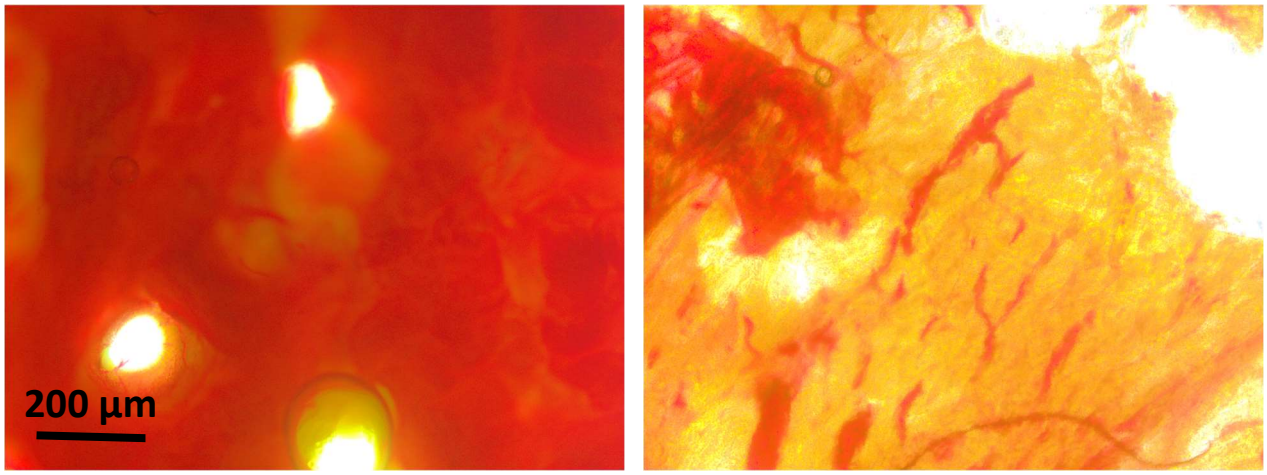
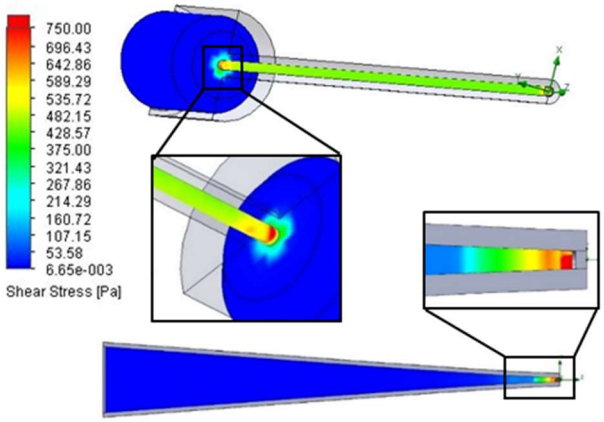
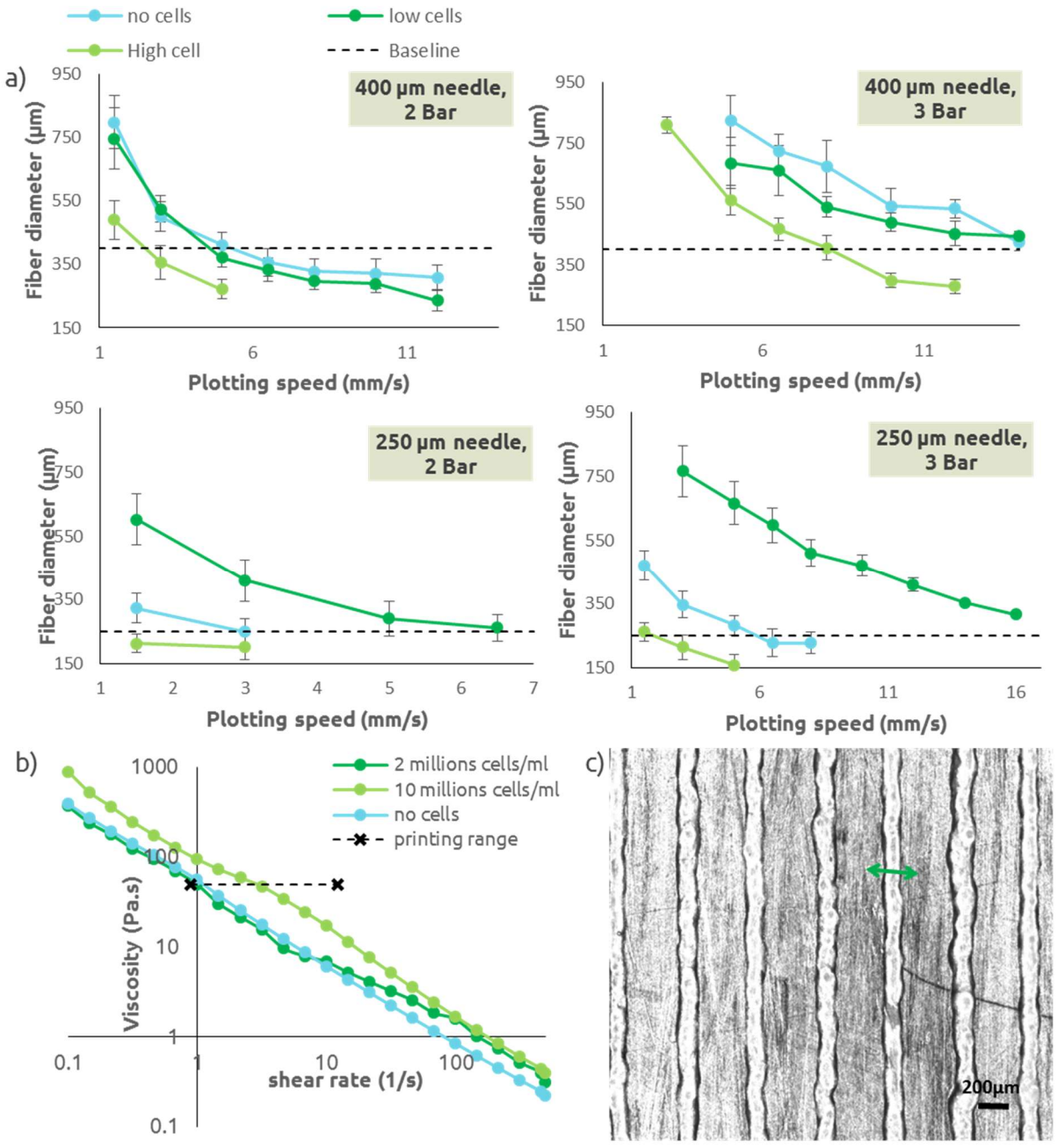


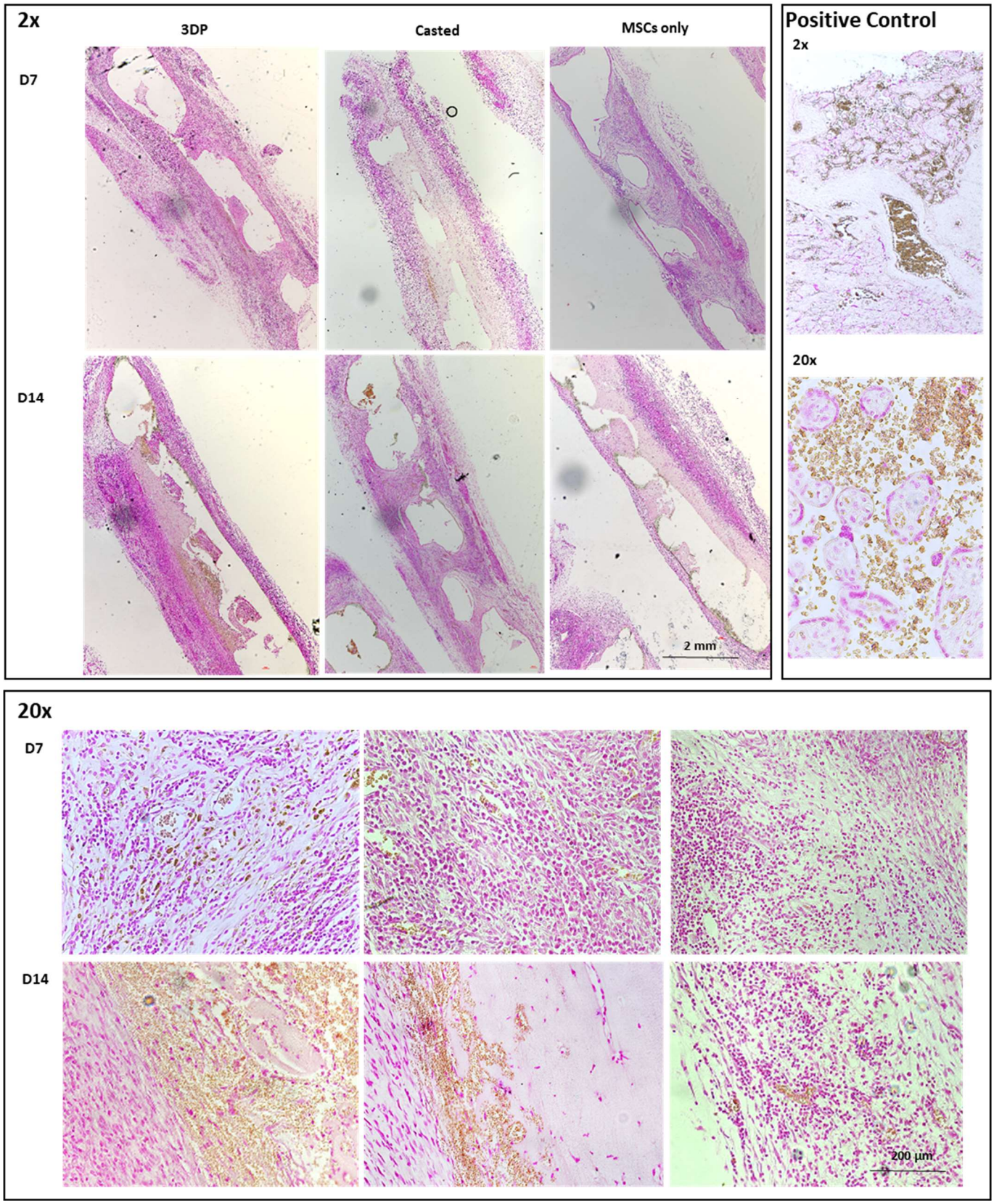
Supplemental Figure I: Qualitative assessment of the gelatin content of the 3D printed scaffolds directly after printing (left) and 24h after incubation at 37°C (right). Picro-Sirius Red stain was used, collagen or gelatin fibers are stained red.



501 **Supplemental Figure II:** Computational modeling of flow in 200µm conical and cylindrical needles at 3.5 bar. Heat maps of the simulated fluid flow induced shear stresses for both needle types.



Supplemental Figure III: Fibrin bioink printing accuracy. (a) Extruded fiber diameter as a function of extrusion pressure, plotting speed, and cell density for variable needle inner diameter (n=9). The baseline line represents the targeted fiber diameter (i.e. needle inner diameter). (b) Rheological evaluation of fibrin bioink seeded with variable density of L929s. The printing shear rate was calculated for every printing condition, the printing shear rate range is represented in black. (c) Bioplotter image of extruded fibers used to measure extruded fiber diameter.



Supplemental Figure IV: Von Kossa staining. Micrographs of embedded, sectioned and stained samples (rMSCs only, rMSCs/RAECs control or rMSCs/RAECs 3DP) using Von Kossa, 7 or 14 days implantation *in vivo*. Calcuim depsoits are stained brown to dark depending on UV exposure. 0.1% Nuclear Fast Red Solution was used as a counterstain, staining nuclei pink. Von Kossa staining showed increased mineralization between day 7 and day 14 in all groups, with the most increase shown in the rMSCs/RAECs control and rMSCs/RAECs printed groups.