Supporting information

Development of bioactive short fibers reinforced printable hydrogel with tunable mechanical and osteogenic properties for bone repair

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Bioink Composition	**Nozzle Size**	**Extrusion Pressure kPa**	**Printing Temperature**	**Filament**
G10	**21**	**180**	**25**	**Good**
G7F10	**21**	**----**	**-----**	**-----**
G8A2F10	**21**	**----**	**----**	**-----**
G7A3F10	**18**	**60**	**27**	**Good**
G8A2F5	**18**	**60**	**25**	**Good**
G8A2F10	**18**	**80**	**27**	**Good**
G8A2F20	**18**	**140**	**28.5**	**Good**
G8A2F30	**18**	**160**	**29.5**	**Started to show nods**

Table 1: Optimization of bioink with different parameters. The numbers beside each letter indicates the percentage of that component, for example G7A3F10 indicates GelMA 7%, Alginate 3% and Microfiber 10 mg/mL.

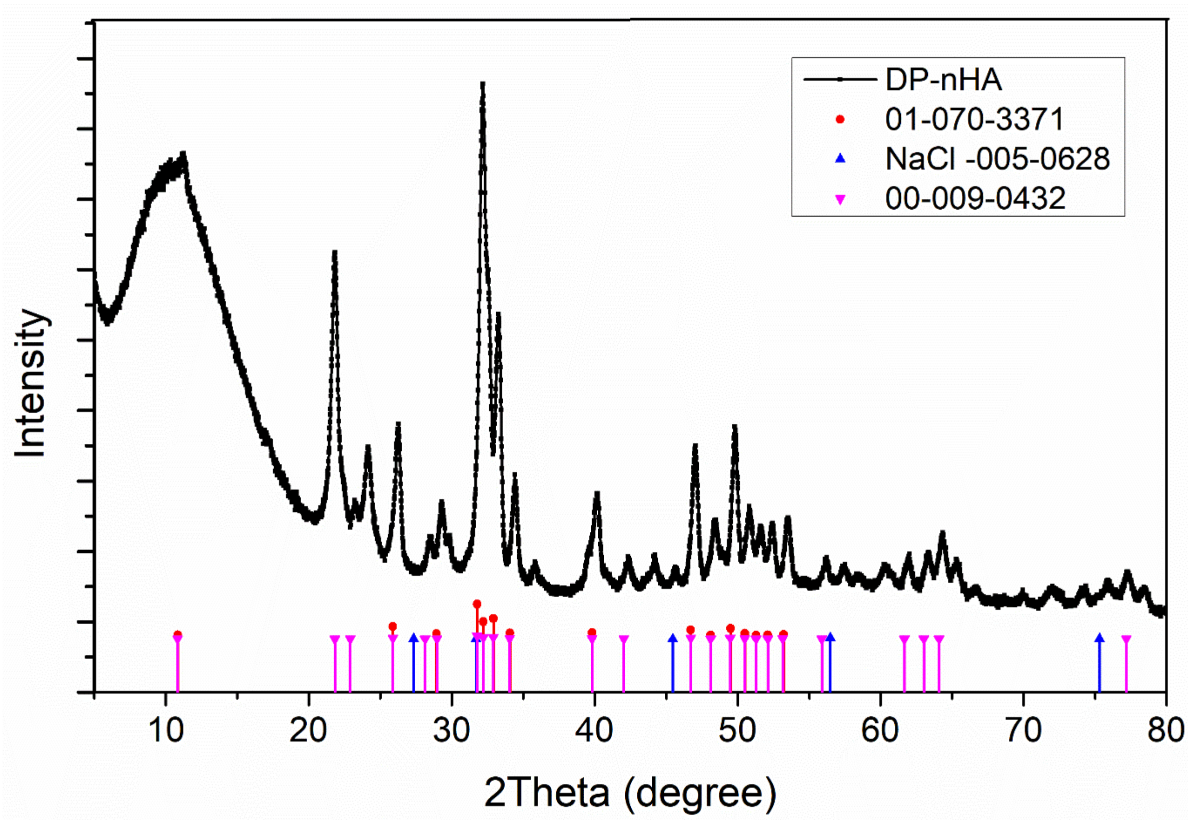

Figure S1: XRD diffraction pattern of hydroxyapatite nanoparticles coated PLA microfibers

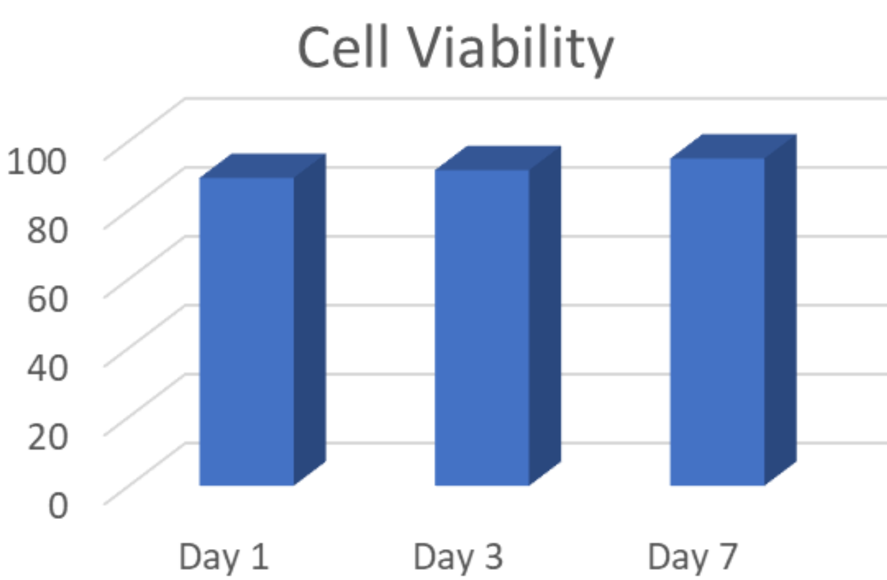

Figure S2: Quantitative histogram for cell viability at day 1, day 3 and day 7 after printing with cell laden bioink G8A2F20HA.

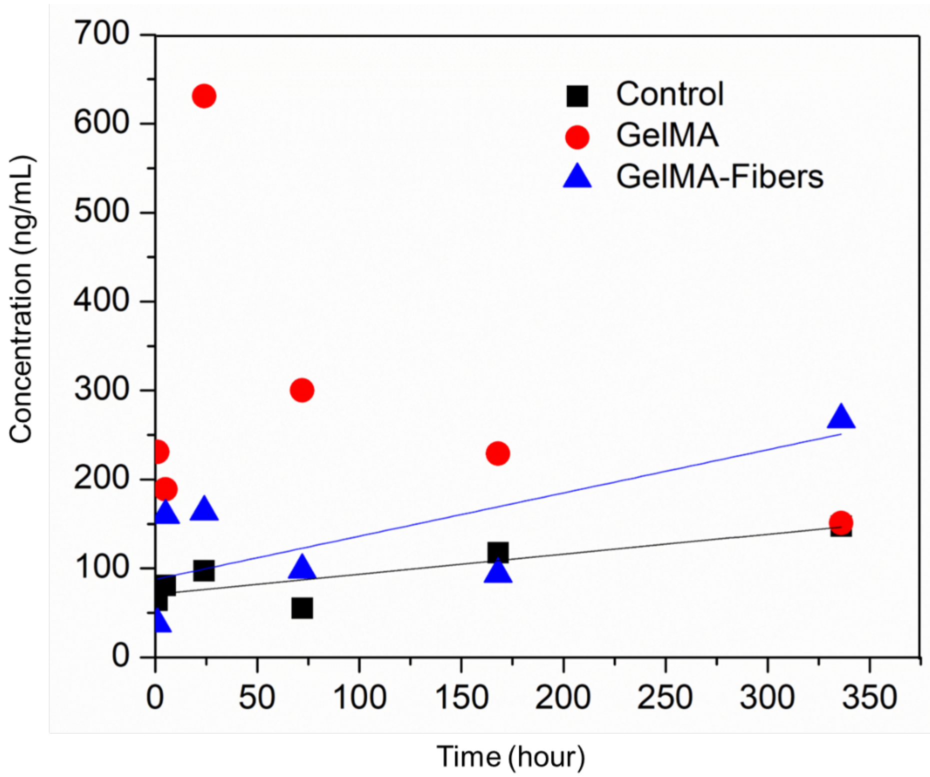

Figure S3: TGF-β release from PRF core mixed in the hydrogel and PRF core mixed with hydrogel including microfibers.

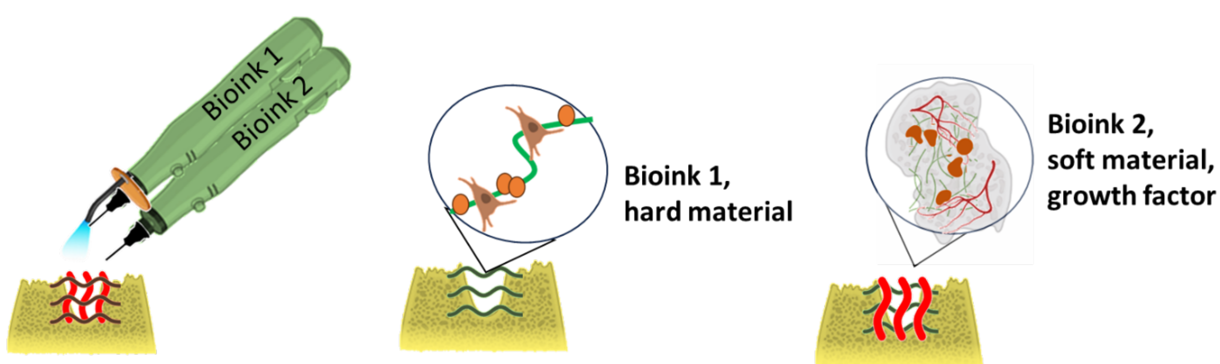

Figure S4: Schematic illustration of the second approach for using handheld injecting device with in-situ UV irradiation for layer-by-layer printing of bioink 1 and bioink 2 as multi-material bone filler.