



Cutaneous Wound Healing and Skin Reconstruction Using Biofabrication-Based Therapies

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Purpose: Non healing wounds and skin loss are major healthcare problems around the world costing the healthcare systems billions of dollars a year. The Herston Biofabrication Institute (**Burns, Skin & Wounds Program**) aims to utilize biofabrication strategies for effective wound healing (**Figure 1**).

Our approach: The Burns, Skin Wounds Program is focused on:

- ❖ 3D patient assessment of burn depth and size to guide surgical planning and treatment using advanced 3D imaging technologies.
- ❖ Post operative burn scar management using 3D scanning, 3D modeling, and 3D printing for custom pressure devices and prosthetics (**Figure 2**)
- ❖ Optimizing the skin culture techniques, and development of tissue engineered skin as an alternative to the use of donor skin for burns patients (**Figure 3**)

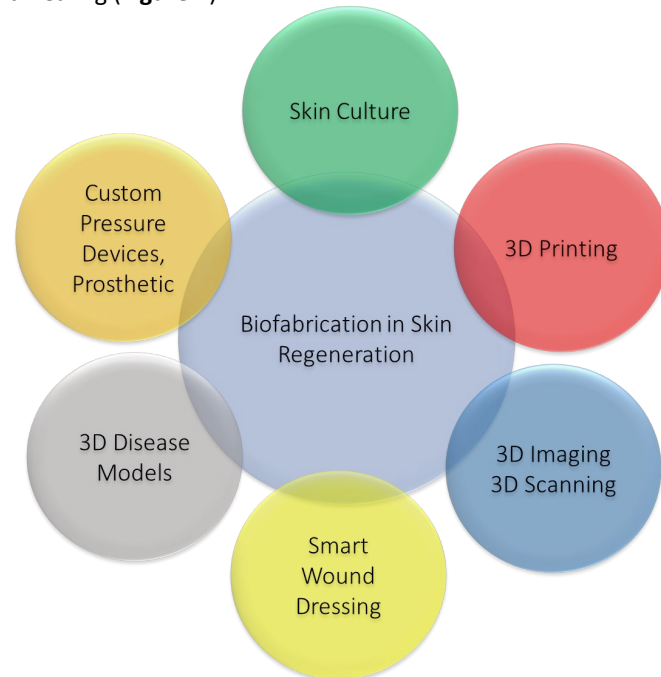


Figure 1 :: Biofabrication techniques in skin regeneration and wound care.

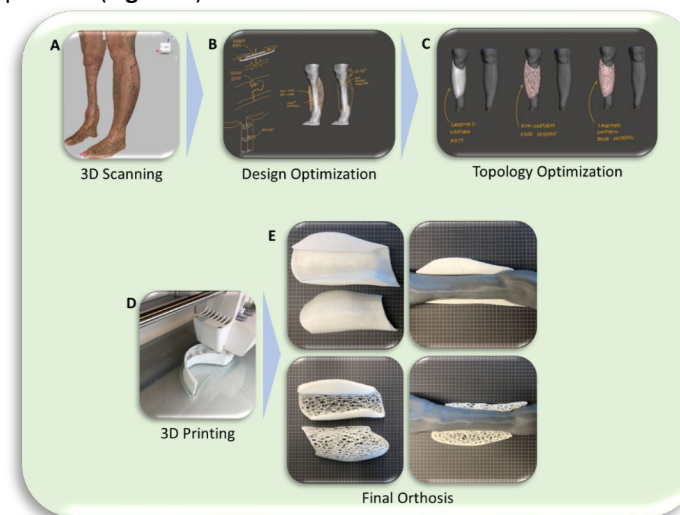


Figure 2: Design and 3D printing of patient specific orthosis for leg burns (Images provided by Mr. Roozbeh Fakhr).

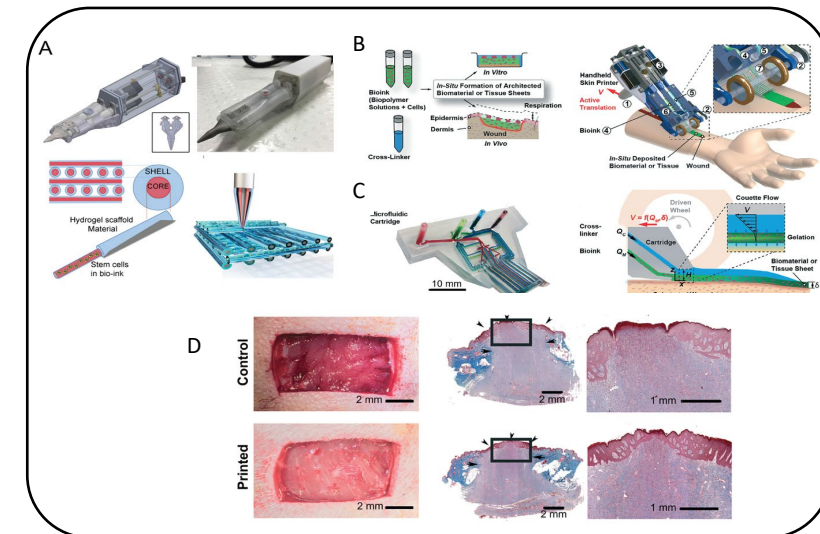


Figure 3: In situ bioprinting of skin cells to generate functional skin layers and accelerate wound healing of full thickness wounds. Heinrich MA, Small. 2019.

Conclusions: Conducting translational research through the emerging and state of the art biofabrication technologies allows us to provide the highest clinical benefit in patients. These emerging techniques have the immense potential to radically revolutionize therapies for patients with non healing wounds and large skin loss.