

Guiding Bone Structural Replication

Background: Bone autografts are currently the ideal material for repair of large bone defects, but there is limited availability of these grafts to patients. Allografts are another option however allografts have the potential for disease transmission and poor long-term mechanical stability. A more efficient, less problematic alternative is the use of slowly resorbable, patient specific polymer scaffolds that support rapid bone growth and maintain mechanical integrity throughout healing. These patient specific scaffolds also provide the potential to be used as cartilage supporting structures.

Applications:

- *Valuable therapeutic tool to aid in bone regeneration in places of focal bone loss, where structure is critical to the support of loads placed on the bone*
- *Scaffold can also be used for bone loss near fractures, to accelerate fusions or as a scaffold to support other tissues such as cartilage*

Advantages:

- *Scaffold would enable the patient to begin using their limb without waiting for extensive bone formation to occur, which is an important feature for older patients who tend to heal slowly*
- *Novel strategy of scaffold design that no one else is currently pursuing, and this novel design ensures that bone healing occurs in a way that rapidly duplicates patient's bone structure*

The Technology: University of Arizona scientists are developing a scaffold that would enable more effective bone regeneration in injured tissue. The scaffold material is inexpensive, has the strength to support immediate limb loading, and resorbs slowly enough to transfer functional load bearing to new bone. An additional benefit to using this scaffold design is that it can be produced using free form fabrication (FFF) to make a range of geometric shapes and patient specific internal porous structures.

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Status: Available for License

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