Scaffold Fabrication for Bone Tissue Regeneration:

Rapid prototyping Vs. Bio plotter

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Abstract:

Bone tissue engineering where in the focus is, on development of bone which helps in replacing metallic implant. The scaffold fabrication is the most critical stage in bone tissue regeneration. The architecture of scaffold to generate the bone tissue at a faster rate using stem cells is the field of research for engineers and thus perfect amalgamation of engineering and biology is seen in the said area.

The generation of scaffold with different architecture and using various materials is possible using rapidprototyping and bioplotter. In this paper, author has shown the comparison of developing the scaffold using these two techniques.

Rapidprototyping is well known technique where the physical model from computer model (CAD model) is possible without human intervention and tooling. The author has done extensive work in developing scaffold using fused deposition modelling technique (FDM) of rapidprototyping and also using bioplotter. The scaffold generation using RP is cost effective but limitation is on various architecture and limited materials. The bioplotter is versatile and can be used with various materials and different architecture. The author has carried out the experimentation in developing the scaffold using both technique and results are compared in this paper.

The rapidprototyping assisted bone tissue generation is preferred where there is resource limitation and hence its use in developing countries is justified.

Keywords: rapidprototyping, fused deposition modelling ,Bioplotter, scaffold, stem cells