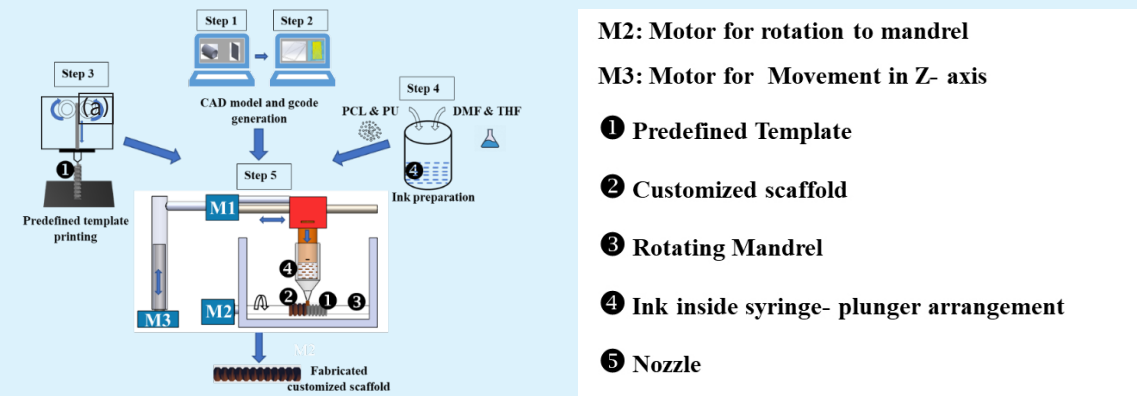


24. Title: Tubular scaffold

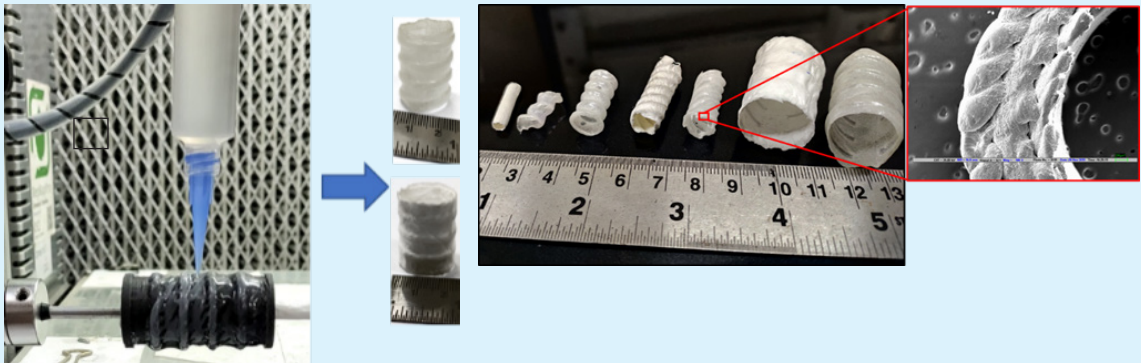
Inventor: Prof. Pulak M. Pandey, Department of Mechanical Engineering

Keywords: Tubular Scaffold, 3-D Printing

Domain: Healthcare



(b)



(c)

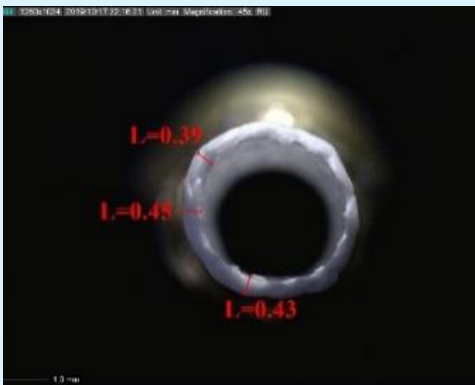


Figure: (a) Illustration of developed methodology, (b) Fabrication of different types of customized tracheal scaffolds and representative SEM image illustrating the thickness and wall architecture of 3D printed tracheal wall, and (c) Measurements of thickness of scaffold using optical microscopy

Summary: An accurate methodology to fabricate customized patient specific tubular grafts with enhanced flexibility, reduced cost and product cycle is developed. A novel method to fabricate customized tubular grafts using 3- axis extrusion-based 3D printing machine is developed. The 3D printing machine allows deposition of polymeric solution over an accurate predefined template to fabricate customized tubular parts. 3D printing is emerged to be a suitable manufacturing technique to reduce the product cycle when complex design and shapes are concerned. Therefore, the fabricated route is not only accurate but also capable of generating customized scaffolds with enhanced flexibility and enough strength. The novelty in this method is the use accurately predefined template to fabricate customized tubular scaffolds using 3D printer. The developed process can be applied to the fabrication of all types of stents and tubular scaffolds.

Advantages:

- » Accurate fabrication of grafts with improved flexibility and anti-migration properties.
- » Complex design can be manufactured
- » Repeatability and rapid production of patient specific part
- » Ease of customization of tubular grafts
- » Multi-material printing
- » Easy to produce freeform structures

Applications: Biomedical Industry

Scale of development: A functional prototype tubular scaffold is fabricated and extensively tested in laboratory environment

Technology Readiness Level: 4

IP Status: Indian Patent Application 202011029441