

RESEARCH ARTICLE

A cylindrical slicing algorithm for four-axis non-planar bioprinting of complex geometries

Supplementary file

Video S1. This video demonstrates the fabrication of a branched tubular structure on a rotating mandrel using extrusion-based bioprinting technology. The focus is on the layer-by-layer construction of the lateral channel. The material used in the printing phase is Pluronic F127.

Video S2. This video presents the first fused deposition modeling printing test on a rotating mandrel. The fabricated structure features a convex external surface, which benefits from the ability to plan external layers with a variable radius. In the final part of the video, the formation of these variable-radius layers is shown, demonstrating how they contribute to high surface regularity in the printed part. The material used is polycaprolactone.

Video S3. This video showcases the fabrication of an intravascular stent using fused deposition modeling printing on a rotating mandrel. The highly complex mesh structure would be challenging to produce in a cylindrical shape using traditional printing techniques. However, in this case, it is successfully created without the need for support. The material used is polycaprolactone.

Video S4. This video illustrates the fabrication of a branched tubular structure using fused deposition modeling printing, similar to the one produced with extrusion-based bioprinting (EBB). As in the EBB case, mandrel-based printing allows the structure to be printed without supports, ensuring that both channels remain structurally intact without collapsing or becoming blocked. The material used is polycaprolactone.