



Non-Woven Stent Coating Technology – No Future for the Suture?

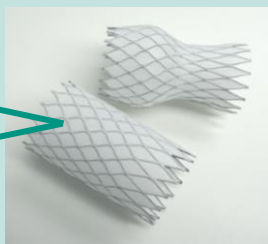
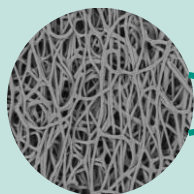
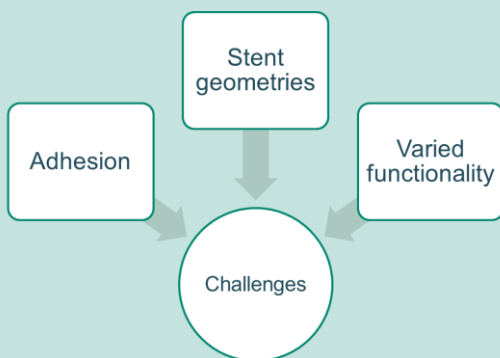
Over the last 12 months at The Electrospinning Company, huge developments have been made in our sutureless stent coating technology platform.

Cardiovascular stents covered with textiles and films have known advantages over uncovered ones, primarily that the coating provides a direct barrier to tissue ingrowth to prevent restenosis. Current manufacturing processes use sutures to stitch a textile to a device, which introduces weak points and roughness.

Our electrospun coating technology addresses the challenge of applying textiles safely and affordably onto stents by using direct deposition which eliminates the need for sutures. We specialise in the design and development of micro and nanofibres with tailored morphology, porosity and mechanical properties, meaning we can make medical textiles that mimic native tissues.

We overcame several challenges in translating electrospinning onto stents. A major break-through came with the development of a coating adhesion process – a platform built through working with stents of different shapes and sizes, as well as with both metal and non-metal substrates.

Ultimately, it was found that adhesion, geometry and desired functionality are closely interconnected and impact the processing methodology we use for each stent.



TAVR and coronary frames were electrospun coated with a range of synthetic polymers and a stable process was developed that produces uniform coatings across different stent geometries.

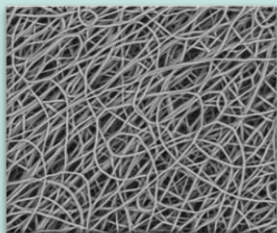
TAVR - transcatheter aortic valve replacement



Pre-expansion



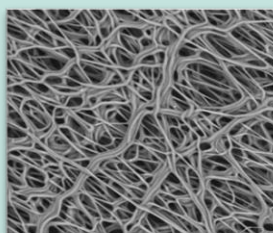
Expanded stent



SEM of coating fibres



150% expansion



SEM of expanded fibres

We developed a novel process to coat expandable coronary stents, producing a sutureless coating that expanded by 150% without tearing or delaminating. Tensile testing the coating material showed that the polymer maintains complete mechanical integrity in fibrous form following maximal expansion.



The coatings team compare different coated stent geometries

Over the last 12 months, The Electrospinning Company's sutureless stent coating technology platform has advanced to include processes for adhesion, uniformity and expansion onto a variety of stent geometries – demonstrating just how applicable electrospinning is to medical device coatings.

"We want to get the word out there to everyone who works in our field - this can be done! It can be done at scale, in fully ISO certified cleanroom conditions, and it's going to be game-changing for the industry. We have experience bringing a product all the way from prototype, to validation, to manufacture, and we're bringing this experience to the field of sutureless stent coatings" - Dr Katrina Moisley, Product Development Manager for Coatings.

The Electrospinning Company Ltd

Unit 5, Zephyr Building, Eighth Street, Oxfordshire, OX11 0RL, United Kingdom