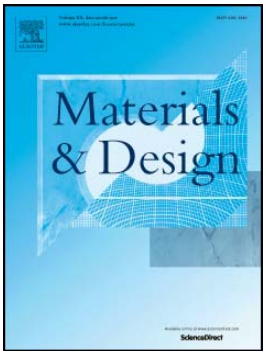

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Influence of Design Parameters on the Mechanical Behavior and Porosity of Braided Fibrous Stents

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Abstract

In spite of all innovations in stent design, commonly used metallic stents present several problems such as corrosion, infection and restenosis, leading to health complications or even death of patients. In this context, the present paper reports a systematic investigation on designing and development of 100% fibre based stents, which can eliminate or minimize the problems with existing metallic stents. For this purpose, braided stents were produced by varying different material, structural and process parameters such as mono-filament type and diameter, braiding angle and mandrel diameter. The influence of these design parameters on mechanical behaviour as well as stent's porosity was thoroughly investigated, and suitable parameters were selected for developing a stent with mechanical characteristics and porosity matching with the commercial stents. According to the experimental results, the best performance was achieved with a polyester stent designed with 0.27 mm monofilament diameter, braiding angle of 35° and mandrel diameter of 6 mm, providing similar properties to commercial Nitinol stents.

Keywords: Fibrous stents, Braiding, Design parameters, Mechanical behavior, Porosity.

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