

Significant Healing Superiority Of Non-woven Over Knitted/Woven Surgical Mesh Structures Presented During The 2016 World Biomaterials Congress To Worldwide Biomaterials Experts

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The World Biomaterials Congress, held every four years, brings together the worlds experts on biomaterials design and research. At this year's Congress 1,200 oral presentations and 2,400 poster presentations met the peer review criteria for presentation at the meeting. The assembled experts gave presentations on a wide range of topics including anti-infective biomaterials, biomaterials and cellular signaling, 3D biomaterial printing, biomaterials and host response, nanomaterial biocompatibility, fibrosis and biomaterials, biomimetic materials and biomaterials as stem cell microenvironments.

As a part of this Congress, a presentation on the "Influence of mesh structure on surgical healing in abdominal wall hernia repair" was given demonstrating the superior healing qualities of non-woven vs. knitted/woven surgical mesh structures. In the experimental work performed in the rabbit model over periods up to 180 days, clinically used non-woven surgical mesh structures were found to provide on average a 98.6% to 99.8% confluent layer of fibrous connective tissue healing throughout the surgical mesh structure. Comparable clinically used knitted/woven surgical mesh structures only provided an 81.2% to 93.6% confluent layer of fibrous connective tissue layer on average. The lack of a confluent layer of fibrous connective tissue in knitted/woven constructions of surgical mesh was caused by the presence of space-occupying adipose tissue, as identified by highly accurate quantitative digital histopathology.

As pointed out in the presentation, the lack of a confluent layer of fibrous connective tissue necessarily weakens a hernia repair potentially leading to stress concentrations in the surgical mesh repair which may be more prone to mechanical failure. This concept was offered up as a mechanism to explain recent medical literature reporting the mechanical failure of knitted surgical mesh constructions in bridging repairs of abdominal wall defects within short time frames of approximately a year. During the post-operative period and long term, non-woven polypropylene surgical meshes (SURGIMESH[®] WN and XB) have not experienced mesh mechanical failure in clinical use in the US. Biomaterials professionals found this new information enlightening on the practical aspects of long term clinical soft tissue repair for improved patient outcomes.

References:

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