

Medtronic Announces TiONIC(TM) Technology, a Titanium 3D Printed Platform for Spine Surgery Implants

Technology Allows for Creation of More Intricate Implant Designs and Surface Textures

DUBLIN and NEW ORLEANS - May 1, 2018 - Medtronic plc (NYSE: MDT) today announced the launch of a titanium 3D printed platform - TiONIC(TM) Technology - that enables more complex designs and integrated surface technologies for spine surgery implants. The announcement was made during the American Association of Neurological Surgeons (AANS) annual meeting in New Orleans, La.

TiONIC Technology is a 3D printed technique that creates enhanced surface textures by utilizing a differentiated laser method. Compared with smooth materials, surface texture has been shown to increase osteoconductivity and promote bone response^{1,2}. And unlike traditional manufacturing techniques, the 3D printing process allows for more intricate implant designs such as the honeycomb shape on Medtronic's recently launched ARTiC-L(TM) Spinal System.

"Surface advancements, like TiONIC Technology, have emerged as a paradigm shift in interbody fusion implants," said Dr. Colin C. Buchanan, neurosurgeon at the Colorado Brain and Spine Institute, in Aurora, Colo. "Implants utilizing newer surface technology can help stimulate a cellular response and give me greater confidence that the patient will have a successful fusion."

ARTiC-L(TM) Spinal System

Click the thumbnail above for a larger image.

ARTiC-L is the first implant from Medtronic to be manufactured using the TiONIC Technology 3D printing technique. The implant is made of titanium and designed for surgeons to use in transforaminal lumbar interbody fusion (TLIF) spine surgery. The implant's 3D printed honeycomb design acts as an osteoconductive scaffold for bony growth into the implant and provides improved mechanical load distribution across the implant.



"ARTiC-L is an important component of Medtronic's portfolio of reproducible solutions for minimally invasive procedures," said Doug King, senior vice president and president of Medtronic's Spine division, which is part of the Restorative Therapies Group at Medtronic. "Our 3D printed TiONIC Technology allows devices such as ARTiC-L - and our future interbody implant portfolio - to offer surgical advantages not traditionally possible."

Aside from utilizing TiONIC Technology, ARTiC-L enables a streamlined surgical workflow that requires only one instrument for implant insertion and positioning. The ARTiC-L system is designed to facilitate sagittal alignment of the spine by offering various lordotic angles up to 20 degrees.

The ARTiC-L device incorporates the technology of Gary K. Michelson, MD

About Medtronic

Medtronic plc (www.medtronic.com), headquartered in Dublin, Ireland, is among the world's largest medical technology, services and solutions companies - alleviating pain, restoring



health and extending life for millions of people around the world. Medtronic employs more than 84,000 people worldwide, serving physicians, hospitals and patients in approximately 160 countries. The company is focused on collaborating with stakeholders around the world to take healthcare Further, Together.

Any forward-looking statements are subject to risks and uncertainties such as those described in Medtronic's periodic reports on file with the Securities and Exchange Commission. Actual results may differ materially from anticipated results.

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1 Wennerberg, A. and Albrektsson, T. (2009), Effects of titanium surface topography on bone integration: a systematic review. Clinical Oral Implants Research, 20: 172-184.

2 Animal testing is not necessarily indicative of human clinical outcomes.

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