COMPANY
**NOVAX DMA**

LOCATION
**Argentina**

SOFTWARE
**Autodesk® Within Medical**

# NOVAX DMA

## Expanding design possibilities with the use of additive manufacturing software

"Within Medical has contributed enormously to changing the way in which we design and manufacture implants. It is a tool with which both custom made and standardized implants can be designed and developed in a much more biological and intelligent way. As both a surgeon and a designer, I believe this is the most important tool I have ever used, enabling us to make anatomic designs that would be impossible with other software."

—**Daniel Fiz**
Company Founder
Novax DMA

Image courtesy of Autodesk®

**Daniel Fiz took his degree in medicine and combined it with his passion for making, and in 1993 founded Novax DMA.**

Based in Buenos Aires, Argentina, Novax DMA specializes in the research, development, production, and marketing of innovative medical technologies. they primarily make medical implants for traumatology, orthopedics, and cranial surgery. The company is now represented in over 15 countries and has created a separate division, Protolab 3D, to focus on custom implants using additive manufacturing.

Protolab 3D was a passion project. "I started exploring the use of additive manufacturing for impacts in 1999," explains Fiz. "When I learned about this new technology called stereolithography, I knew it was going to change the way we create medical implants." Acting as a research facility, Protolab 3D helped Novax DMA create custom-made implants using additive technology. Soon after, the company began using Autodesk® Within Medical software to help expand its design possibilities.

As the company's technical capabilities have increased, so has the range of implants it creates. Novax's first trabecular implant was a craneoplasty, followed by a complex acetabulum, a massive lumbar vertebra replacement, a jaw reconstruction and more recently, a tibial and femoral massive replacement. Altogether Novax has worked with doctors and patients to implant more than 500 custom made implants. The most recent customized 3D printed implants include those for pets such as tibial canine plates and cervical canine spacers.

"In nature, our bones don't have the same porosity in places that bear weight in compared to those that don't," says Fiz. "Biologically, bone cells deposit different material and mineral densities in different parts depending on the structural needs of the body. I believe there are only two ways to create implants with a porous structure to enable osseo integration. One is to apply a porous surface onto the implant through various methods like a plasma spray or coating, and the other is to use Within Medical."

AUTODESK.

# Using Within Medical software to create implants that are much closer to 'the real thing'

"What this software allows us to do is clearly design the porosity of bone implants, and essentially create any complex structure that you want. In the past, with traditional coating methods, it was very difficult to have control of the porosity and it was a challenge to create interconnections between the pores. Now we can create porous interconnections, regulate the dimensions of each pore and regulate the density of the pores in different parts of the implant, meaning we can create an implant which is much closer to 'the real thing'."

Having designed an implant customized to the individual patient, Fiz and his team work with 3D printing partners **Alphaform** and **EOS** to manufacture the finished product. Most recently, the company has been able to 3D print directly in titanium, a major breakthrough as previously they relied on either polymer filled molds or the use of conventional subtractive methods.

Fiz is already looking ahead to the next wave of technological development. "I am convinced that the next step is the incorporation of the 4D printing concept in our field. It will allow us to use a minimally invasive approach to implant simplified geometry pieces that once in their place and under stimuli would change into a final complex geometry. In the longer term, I can see implants that will be able to modify their geometry depending on the body's mechanical demands."

**www.novaxdma.com**
**www.protolab3d.com**

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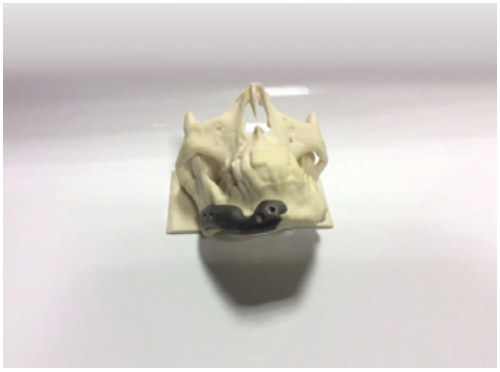

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