

PRESS RELEASE

GRAPHIC MATERIAL (movies, pictures, etc.) : http://www.kokoz-depot.be/layerwise/download_center.html
(copy-paste URL in browser-window if needed)

LayerWise builds the world's first patient-specific lower jaw using laser technology

LayerWise applied Additive Manufacturing (AM) to produce an award-winning Titanium total lower jaw implant reconstruction, developed in collaboration with project partners from medical industries and academia. To treat a senior patient's progressive osteomyelitis of almost the entire lower jawbone, medical specialists and surgeons opted for such a complete patient-specific implant the first time ever. AM technology specialists at LayerWise printed the complex implant design incorporating articulated joints and dedicated features. The reconstruction – post-processed with dental suprastructure provisions, polished joint surfaces and a bioceramic coating – has been implanted successfully. It restored the patient's facial esthetics and allowed her to regain her speech within hours.

Complex AM implant produced as a single part

LayerWise in Leuven, Belgium, produced the metal implant structure layer by layer using its dedicated metal AM technology. A high-precision laser selectively heats metal powder particles, in order to quickly and fully melt to properly attach to the previous layer without glue or binder liquid. As layers are built successively, AM hardly faces any restrictions to produce the complex lower jaw implant structure. AM is used to print functional implant shapes that otherwise require multiple metalworking steps or even cannot be produced any other way.

The revolutionary patient-specific implant has been developed and produced under supervision of Prof. Dr. Jules Poukens, in collaboration with specialized industrial and academic parties in Belgium and The Netherlands (see list below). Just recently, the innovative implant was granted the "2012 AM-Award" by the Additive Manufacturing Network in Belgium. The jury members of SIRRIS and VITO praised the fact that AM played a decisive role in the realization of this revolutionary mandible implant.

A giant leap forward in mandibular treatment

Dr. ir. Peter Mercelis, Managing Director of LayerWise: "Besides a successful track record in industrial sectors, metal AM is gaining importance in medical implantology. AM's freedom of shape allows the most complex freeform geometries to be produced as a single part prior to surgery. As illustrated by the lower jaw reconstruction, patient-specific implants can potentially be applied on a much wider scale than transplantation of human bone structures and soft tissues. The use of such implants yield excellent form and function, speeds up surgery and patient recovery, and reduces the risk for medical complications."

Prof. Dr. Jules Poukens of the University Hasselt: "The new treatment method is a world premiere because it concerns the first patient-specific implant in replacement of the entire lower jaw. The

implant integrates multiple functions, including dimples increasing the surface area, cavities promoting muscle attachment, and sleeves to lead mandible nerves. Furthermore, the mandible implant is equipped to directly insert dental bar and/or bridge implant suprastructures at a later stage. I led the team of surgeons who implanted the AM-produced structure during a surgery of less than four hours at the Orbis Medisch Centrum in Sittard-Geleen. Shortly after waking up from the anesthetics the patient spoke a few words, and the day after the patient was able to speak and swallow normally again.”

ABOUT LAYERWISE

LayerWise is one of the top players in metal Additive Manufacturing technology. As an AM technology innovator, LayerWise stretches the limits of metal part performance and manufacturing economics. After gaining recognition across industrial sectors, AM is increasingly being adopted in different medical fields such as dentistry, orthopaedics, maxillofacial and spinal surgery. LayerWise intensively collaborates with academic partners, and heavily invests in research and development to push the boundaries of AM technology. www.layerwise.com

LayerWise movie : <http://www.youtube.com/watch?v=0nk8wOJQViM> (720p available on request)

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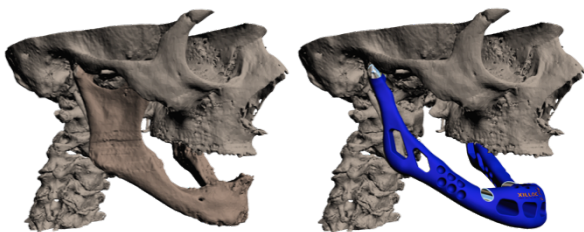
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ABOUT THE PROJECT

The new method has been developed by the Biomed research group of the University Hasselt (B) in collaboration with engineers from the Xios Hogeschool (B), Xilloc Medical BV (NL) and University Leuven and maxillofacial surgeons from the Orbis Medisch Centrum Sittard-Geleen (NL). LayerWise NV (B) produced the implant structure, which was coated with a bioceramic coating by Cam Bioceramics BV (NL).



The world's first patient-specific total lower jaw implant, produced by AM specialist LayerWise.



Surgeons replaced the entire lower jaw bone structure with a patient-specific total mandible implant.



Titanium and features reduce implant weight. Cavities facilitate muscle diagastric attachment and ingrowth.



The team of surgeons and engineers, while implanting the AM-produced patient-specific mandible structure.



X-ray images showing the AM-produced lower jaw reconstruction implanted into the patient (left: side view; right: front view).



- Medical : Prof. Dr. Jules Poukens, Dr. Ingeborg van Kroonenburgh, Dr. Richard Barkhuysen – Maxillofacial Surgeons of Orbis Medisch Centrum Sittard-Geleen
- Case Preparation : Ing. Maikel Beerens, Dr. ir. Michäel Daenen, Dr. ir. Peter Mercelis and ir. Ruben Wauthlé, ir. Carsten Engel, Prof. Dr. Jules Poukens, Dr. Ingeborg van Kroonenburgh, Prof. Dr. Jos Vander Sloten
- Design: Ing. Maikel Beerens
- Manufacturing: Dr. ir. Peter Mercelis and ir. Ruben Wauthlé (LayerWise NV), Cam BIOCERAMICS BV and Ing. Maikel Beerens (Xilloc BV)
- Histology : Prof. dr. Jules Poukens, Prof. Dr. Ivo Lambrichts
- Dental components / suprastructure : Dr. Frank Schnabel, LayerWise NV – DentWise division