

SUCCESS STORY



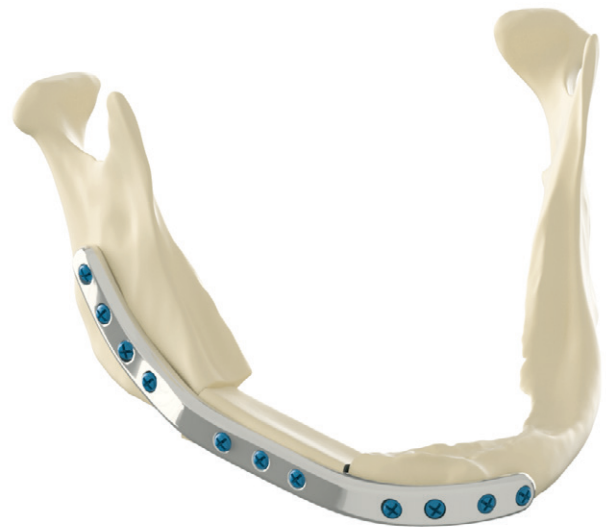
CQFA CARREFOUR QUÉBÉCOIS
DE LA FABRICATION ADDITIVE

AN INNOVATIVE AND CERTIFIED MANDIBULAR PROSTHESIS

Investissement Québec-CRIQ (IQ-CRIQ) supports Québec companies in their innovation and technological transformation projects. Metal 3D printing, also known as additive manufacturing, is one of several cutting-edge fields of expertise offered by IQ-CRIQ. This 3D printing technique helps companies optimize supply chains and manufacture small series. Working jointly with the CHU de Québec, IQ-CRIQ has added a new string to its bow: Medical 3D printing.

THE LARA 3D LABORATORY: THE FRUIT OF AN ENCOUNTER BETWEEN TWO FIELDS OF EXPERTISE

In 2017, IQ-CRIQ engineers met with doctors at the CHU de Québec who sought to improve their surgical techniques. Following these discussions, the groundwork was laid for a more substantial project, giving rise to LARA 3D, a 3D anatomical reconstruction laboratory. The laboratory houses two 3D printers that serve as a basis for the specialists' work, along with many state-of-the-art equipments that provide finishing, cleaning, sterilization and polishing procedures for high-quality parts.



Mandibular Prosthesis

AN AMBITIOUS LAUNCH

The LARA 3D laboratory's very first project sought to design a mandibular reconstruction solution, along with two surgical guides. The traditional techniques currently used by surgeons involve the installation of metal plates on the jawbone of patients requiring maxillofacial reconstruction surgery, often after a bout with oral cancer. The need to adjust these plates to the patient's morphology makes surgical efforts both difficult and time consuming.

IQ-CRIQ's solution was to design implants that are perfectly adapted to the patient's anatomy. Using the patient's imaging data, the implants are printed using one of many available additive manufacturing technologies, here laser fusion on a metal powder bed.

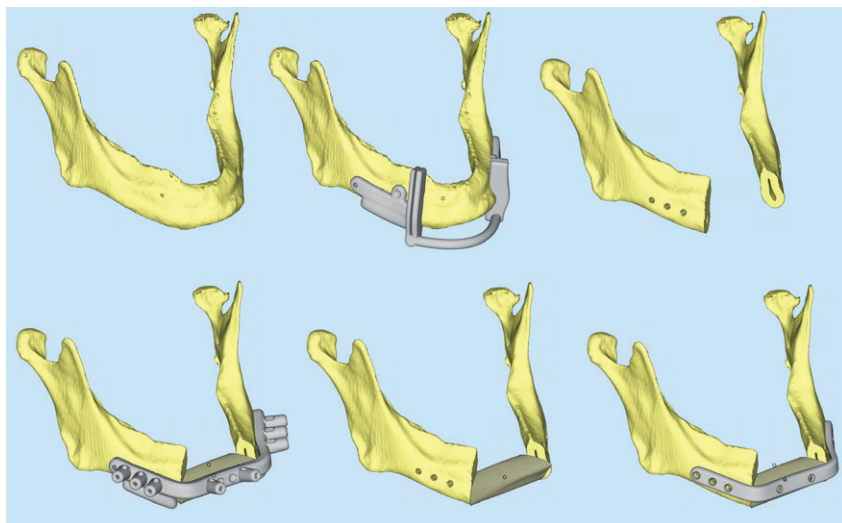
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“The project is a win-win situation for both the hospital system and the patients. Medical customization represents the future of health care; this goal can be achieved through technologies like metal 3D printing.”

– Olivier Marcotte,
expert in complex automation and
metal additive manufacturing,
IQ-CRIQ



Processus with guides

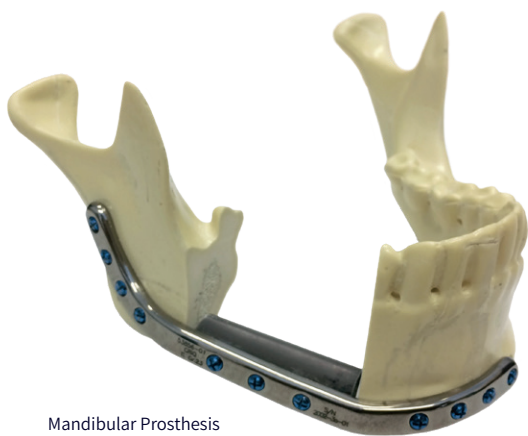
PROVEN RESULTS

According to IQ-CRIQ’s Olivier Marcotte, an expert in complex automation and metal additive manufacturing, this innovation could reduce surgery times by up to 25%. It can optimize the work of medical staff, and the reduced surgery times will often speed up patient recovery. Designed from their own anatomy, customized bone reconstruction also affords patients greater comfort.

HEALTH CANADA CERTIFICATION

Innovations like those offered by IQ-CRIQ do not happen overnight. According to Mr. Marcotte, these medical pieces were developed and manufactured over a four-year period. The first step was to obtain the best available equipment while setting up the laboratory that would produce the parts. Then came the extremely demanding but essential Health Canada certification process that would ensure the implants’ compliance with the strictest quality management requirements for medical device production. The collaboration between the CHU de Québec and IQ-CRIQ became a key factor when obtaining Health Canada certification.

Today, every team involved is proud of its progress. Medical 3D printing is not a highly developed sector in Quebec; the LARA 3D laboratory’s contributions were fundamental in this regard. It is worth noting that it was the first time Health Canada granted certification to a Canadian organization for an implantable 3D-printed device. Mr. Marcotte advises all future researchers to undertake the certification process one step at a time while maintaining close communication with the parties involved after choosing partners that can provide complementary expertise and help move the process forward. This journey continues to demonstrate Quebec’s innovative capabilities in cutting-edge technologies while reaffirming the importance of collaboration.



Mandibular Prosthesis