

Bespoke Medical Devices for Craniomaxillofacial Surgery

Source: OMX Solutions



Additively Manufactured
OMX Solutions OsseoFrame

Challenge

Need to manufacture cost-effective custom OsseoFrame designs that help simplify the entire dental rehabilitation process, allowing patients who were previously not suitable for dental prosthetics a single-stage solution

Solution

Additively manufactured bespoke OsseoFrame from EOS Titanium Ti64 powder material on an EOS M 290 system

Results

Custom-made: perfect patient fit

Cost-effective with less material wastage

Aid in patient recovery with single-stage solution

Quick delivery of custom-made solution and simple surgical treatment with teeth restoration during surgery



3D Printing of Patient-Specific Implants That Aid in Healing

Additive manufacturing is revolutionizing the medical industry by allowing bespoke medical solution provider OMX Solutions to design and manufacture custom medical devices that are both efficient and cost-effective for the patient.

OMX Solutions' OsseoFrame is a versatile, easy to install, dependable and accurate solution for dental prosthetic rehabilitation. The subperiosteal jaw implant is particularly well suited to patients who lack sufficient alveolar bone to support conventional dental implants. These implants avoid the need for complex adjunctive procedures such as on-lay bone grafts, expensive barrier membranes, sinus lift surgery or intrusive zygomaticus implants.

Designed and custom-made to simplify the entire dental rehabilitation process, the subperiosteal jaw implant is ideal for edentulous patients who do not have enough jaw bone to support dental implants. It helps to restore the function and esthetics of the patient's teeth, ultimately providing pain-free function and improving the patient's quality of life.

Challenge

OMX Solutions specializes in the design and manufacture of world-class custom oral and maxillofacial surgical devices.

The custom design requirements of the OsseoFrame, such as the need for unique shapes, sizes and materials, make it difficult to be cost-effectively manufactured with

a traditional approach. While the OsseoFrame could certainly utilize other traditional manufacturing methods, such as CNC milling or cast pouring, this would result in greater amounts of material waste than additive manufacturing and would require more complex post-processing, such as surface treatments and heat treatment.

Short Profile

OMX Solutions supplies innovative, print-to-order, bespoke medical devices for the specialized area of cranio-maxillofacial surgery.

Born of the digital age, OMX Solutions has adopted additive manufacturing to disrupt the medical supply chain. With both additive manufacturing technologies and their experienced medical CAD CAM designers, they have the flexibility to provide custom medical devices and medical solutions to help address patients' needs rapidly.

OMX Solutions have the capability to produce an unlimited range of medical devices that were previously not possible and are only limited by our imagination.

Further information
www.omx-solutions.com

Traditional manufacturing methods are complex and often require extensive and costly post-processing procedures, resulting in higher waste, additional cost and longer manufacturing leadtimes.

OMX Solutions has adopted additive manufacturing to disrupt the traditional rigid medical manufacturing supply chain. Through the use of EOS M 290 additive manufacturing system and EOS Titanium Ti64 material, OMX Solutions seeks to provide reliable and unique one-of-a-kind devices to treat complex indications.

Solution

OMX Solutions decided to use EOS M 290 manufacturing systems with the support of their manufacturer partner, BresMedical Pty. Ltd.

BresMedical was one of the few manufacturing bureaus in Australia capable of reaching the level of quality required by OMX Solutions, both in terms of part quality and compliance with the ISO 13485 standard.

By taking advantage of BresMedical's additive manufacturing expertise, OMX Solutions have the ability to produce cost-effective, custom-fit OsseoFrame at manufacturing lot sizes of just one unique piece per customer order.

"Custom-made 3D printed products have the ability to revolutionize the treatment of edentulous patients. New additive manufacturing technology can improve both quality of life and the simplicity of oral surgery. The world of 3D printing is creating a whole new approach to manufacturing medical devices – it's a win for patients and for the healthcare system"

*Dr George Dimitroulis
 Oral Maxillofacial Surgeon*

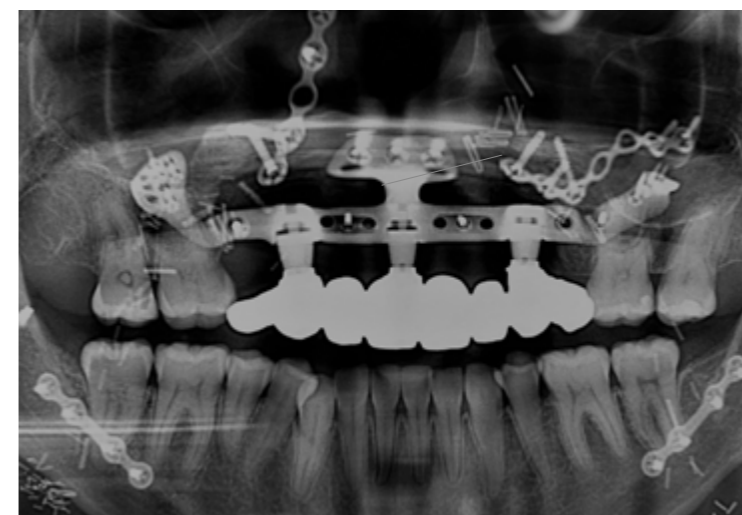
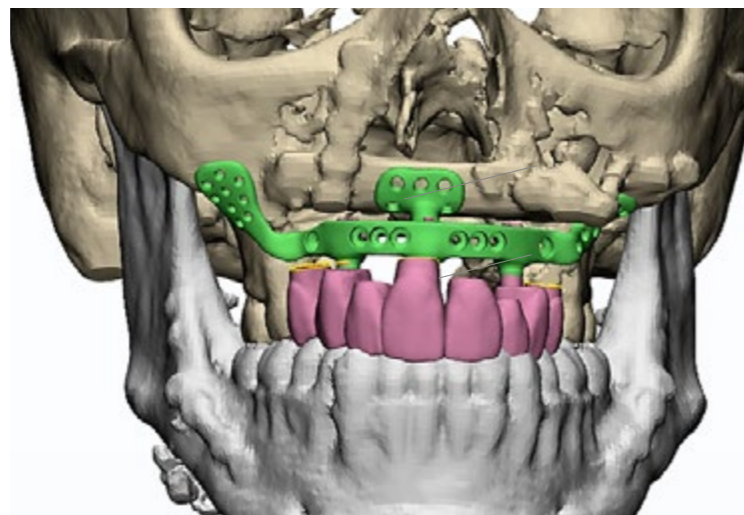
Results

Additive manufacturing has allowed the streamlining of the design process and the prosthetic component to provide a very simple and elegant solution straight to the patient whilst minimizing the time for all specialists involved, including surgeons, prosthodontists, and prosthetists. It generates less waste than other manufacturing methods and is less costly per production order due to the lower volume requirements. Technical success was defined by the finished product matching the initial patient-specific CAD design. Successful surgical implantation is the ultimate determining factor of success with shorter surgery time and faster patient recovery.

- OMX Solutions has designed and produced implants for over 280 patients including 25 with the OsseoFrame implant.
- Availability of the 3D printed OsseoFrame implant is 2-3 weeks, or twice as fast as other manufacturing methods, which require 4-6 weeks.
- The EOS DMLS process allows raw material waste to be minimized as more than 90% of the unmelted powder can be reused.
- Surgery is completed in under 60 minutes in a single step including placement of teeth. The patient leaves the same day with functioning teeth.
- Faster patient recovery within 2-4 weeks. With the traditional method, it takes at least 3 months for osseointegration plus a further 6 months and additional surgery if a bone graft is needed before teeth can be fitted.

"Disruptive, cost-effective technologies such as additive manufacturing will continue to push the boundaries in healthcare including manufacturing itself, improving patient outcomes and reducing costs"

*Mick Shaddock, General Manager
 OMX Solutions Pty. Ltd.*



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