

# Three-Dimensional Craniofacial Bone Reconstruction With SmartBone on Demand

Enzo Facciuto, MD,<sup>\*</sup> Carlo Francesco Grottoli, MSE,<sup>y</sup> Maurizio Mattarocci, MD,<sup>\*</sup> Fausto Illiano, MD,<sup>\*</sup> Mara Compagno, PhD,<sup>z</sup> Riccardo Ferracini, MD, PhD,<sup>s</sup> and Giuseppe Perale, MSE, PhD<sup>yjj</sup>

**Abstract:** This is a report of a 34-year-old male lacking of bone development in the frontal and orbital part of the skull due to a surgical removal of a right orbital-front osteoma at the age of five. The integrity of the craniofacial district was important for the young patient also for social acceptance and self-esteem. Based on computed tomography patient images, a skull model was reconstructed, both digitally and on 3D real model, to best design the needed bone graft. Defect wide extension and surface curvature called for the use of the puzzle technique, where the whole graft is composed by several elements, mechanically slotting into each other. The realization was made possible thanks to the use of a composite xenohybrid bone substitute specifically developed for reconstructive surgery (SmartBone®, by Industrie Biomediche Insubri SA). SmartBone® technology allowed the realization of custom-made grafts which perfectly joined each other and fitted the bone defect thanks to mechanical strength, also at low thicknesses and wide extensions. The postoperative course was uneventful and computed tomography scans showed new bone formation and complete calvaria continuity already ten months after surgery, with no signs of inflammation over the entire follow up. This case study represents a proof of concept that SmartBone® On Demand™ custom-made bone grafts, together with puzzle technique, are effective, easy to handle and provide final excellent functional and aesthetic results.

**Key Words:** Bone substitute, osteoma, reconstructive surgery, xenograft

(J Craniofac Surg 2019;30: 739–741)

From the<sup>\*</sup>AORN Antonio Caldarelli Napoli UOSC of Maxillo-Facial Surgery; <sup>y</sup>Industrie Biomediche Insubri SA, Mazzovico-Vira, Switzerland; <sup>z</sup>Center for Research and Medical Studies, AOU Citta della Salute e della Scienza, Turin; <sup>s</sup>Department of Surgical Sciences (DISC), Orthopaedic Clinic, IRCCS AOU San Martino, Genoa, Italy; and <sup>yjj</sup>University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Manno, Switzerland.

Received June 15, 2018.

Accepted for publication November 8, 2018.

Address correspondence and reprint requests to Carlo Francesco Grottoli, MSE, Via Cantonale 67, CH-6805 Mezzovico-Vira, Switzerland; E-mail: carlo.grottoli@ibi-sa.com

GP is among shareholders of Industrie Biomediche Insubri SA, the Swiss Company owning intellectual property rights on SmartBone, manufacturing and commercializing it, including its custom-made line SmartBone on Demand, that was investigated in this study. CG works for the same company. RF is external clinical advisor to the same company.

The other authors report no conflicts of interest

Copyright © 2019 by Mutaz B. Habal, MD

ISSN: 1049-2275

DOI: 10.1097/SCS.0000000000005277

