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Cranioplasty With Custom Implant Realized Using 3D Printing Technology

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Abstract : Cranioplasty is a surgical act that aims to restore cranial bone losses in order to protect the brain from external aggressions and to improve the patient's aesthetic appearance. This objective can be achieved by taking advantage of the current technological development in computer science and biomechanics. The objective of this paper is to present an approach for the realization of high-precision biocompatible cranial implants using new 3D printing technologies at the lowest cost. The proposed method is to reproduce the missing part of the skull by referring to its healthy contralateral part. Once the model is validated by the neurosurgeons, a mold is 3D printed for the production of a biocompatible implant in Poly-Methyl-Methacrylate (PMMA) acrylic cement. Using this procedure, ten patients underwent this procedure with excellent aesthetic results.

Keywords : cranioplasty, cranial defect, PMMA, 3d printing, custom made implants
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