

On the Development of Medical Additive Manufacturing in Egypt

Authors : Khalid Abdelghany

Abstract : Additive Manufacturing (AM) is the manufacturing technology that is used to fabricate fast products direct from CAD models in very short time and with minimum operation steps. Jointly with the advancement in medical computer modeling, AM proved to be a very efficient tool to help physicians, orthopedic surgeons and dentists design and fabricate patient-tailored surgical guides, templates and customized implants from the patient's CT / MRI images. AM jointly with computer-assisted designing/computer-assisted manufacturing (CAD/CAM) technology have enabled medical practitioners to tailor physical models in a patient-and purpose-specific fashion and helped to design and manufacture of templates, appliances and devices with a high range of accuracy using biocompatible materials. In developing countries, there are some technical and financial limitations of implementing such advanced tools as an essential portion of medical applications. CMRDI institute in Egypt has been working in the field of Medical Additive Manufacturing since 2003 and has assisted in the recovery of hundreds of poor patients using these advanced tools. This paper focuses on the surgical and dental use of 3D printing technology in Egypt as a developing country. The presented case studies have been designed and processed using the software tools and additive manufacturing machines in CMRDI through cooperative engineering and medical works. Results showed that the implementation of the additive manufacturing tools in developed countries is successful and could be economical comparing to long treatment plans.

Keywords : additive manufacturing, dental and orthopedic stents, patient specific surgical tools, titanium implants

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