

3D Medical Printing the Key Component in Future of Medical Applications

Authors : Zahra Asgharpour, Eric Renteria, Sebastian De Boedt

Abstract : There is a growing trend towards personalization of medical care, as evidenced by the emphasis on outcomes based medicine, the latest developments in CT and MR imaging and personalized treatment in a variety of surgical disciplines. 3D Printing has been introduced and applied in the medical field since 2000. The first applications were in the field of dental implants and custom prosthetics. According to recent publications, 3D printing in the medical field has been used in a wide range of applications which can be organized into several categories including implants, prosthetics, anatomical models and tissue bioprinting. Some of these categories are still in their infancy stage of the concept of proof while others are in application phase such as the design and manufacturing of customized implants and prosthesis. The approach of 3D printing in this category has been successfully used in the health care sector to make both standard and complex implants within a reasonable amount of time. In this study, some of the clinical applications of 3D printing in design and manufacturing of a patient-specific hip implant would be explained. In cases where patients have complex bone geometries or are undergoing a complex revision on hip replacement, the traditional surgical methods are not efficient, and hence these patients require patient-specific approaches. There are major advantages in using this new technology for medical applications, however, in order to get this technology widely accepted in medical device industry, there is a need for gaining more acceptance from the medical device regulatory offices. This is a challenge that is moving onward and will help the technology find its way at the end as an accepted manufacturing method for medical device industry in an international scale. The discussion will conclude with some examples describing the future directions of 3D Medical Printing.

Keywords : CT/MRI, image processing, 3D printing, medical devices, patient specific implants

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