

BIO-INSPIRED MATERIALS & ADDITIVE MANUFACTURING METHODS FOR DENTAL IMPLANTS - A REVIEW

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ABSTRACT

Bioprinting is the novel platform to address complex medical problems into 3 dimensional prototypes. Human body structure comprises different internal and external biological components. After World War II, biomaterials gained attention throughout by replacing the injured, diseased, lost human organs. The choice and fabrication of biomaterials plays a vital role in terms suitability, sensitivity and functioning with other organs. Dentistry is one of the most important components of the human body which helps in chewing the food properly and ease the digestion system. A strong tooth provides chewing forces and adequate wear resistance. Dental issues are common throughout the world mostly by food habit. The food and beverages are sugary, the bacteria convert it into acids which attack the tooth and cause cavities, erosion, tooth ache, gum disease, tooth decay and periodontitis, which can lead to infections that spread to other parts of the body. The techniques for replacement of the affected tooth with an artificial one exists from many years ago. This work presents the materials used for dental implants such as Titanium, PEEK, Zirconia, Ti6Al4V, Functionally Graded Materials (FGM) and fatigue life of implants analysed. The bio-suitability and bio-fabrication methods by following additive manufacturing technologies are also discussed. Finally, the review covers a discussion on bio-compatibility for each material and its various future prospects of additive manufacturing technologies.

