

High Performance Polymers and their Application as Dental Implants Abutment

Ehsan Iranmanesh

Kerman University of Medical Sciences, Iran

ABSTRACT

Since the concept of Osseo integration was introduced by Brånemark et al, modern dental implants have been considered a safe and reliable option for replacing missing teeth. By placing dental implants abutment directly in bone, considering different problems regarding its rejection, if every step is done by standard method the implant will be osseointegrated into the alveolar bone. Osseointegration depends on a multiple of factors such as implant material, surgical technique etc. The implant material mostly include titanium and its alloys (mostly Titanium alloys Ti6Al4V) zirconia or even fiber reinforced composite (FRC) which can be a potential material in near future. For past few decades titanium and its alloys have been the material of choice for dental implant's abutment. However, titanium has been shown to exhibit a variety of problems. Because of the high modulus of elasticity of the titanium alloys, dental implants made from the material can cause stress-shielding which may lead to periodontal bone loss. Moreover few cases has been reported with induction of hypersensitivity to the titanium used as implant's abutment also other problems such as Wear debris and ion leakage can also be of concern with titanium dental implants. There is various factor concerning the success or failure of a dental implant by the manner in which stresses are transferred to the surrounding bone. Load transfer from implants to surrounding bone depends on the type of loading, the bone-implant interface, the quantity and quality of the surrounding bone and etc. Finite element analysis (FEA) allows researchers to predict stress distribution in the contact area of the implants with cortical bone and around the implants in trabecular bone. The high-performance biomaterial PEEK (polyether ether ketone) has been applied as implant material in many fields of medicine since the 1990ies. Due to its excellent properties, a high stability and elasticity (elastic modulus: 3-4 GPa), low density (1,32 g/cm³) and insolubility its application have been boosted in the field of dentistry as for the manufacturing of prosthetic reconstructions. Its elastic modulus, similarly to that of cortical bone, it plays an important role as viable alternative to conventional implant materials such as titanium. This reduces the risk of stress shielding around the implant and makes it suitable for use even in orthopedic procedures and spinal surgery.

Biography:

Ehsan Iranmanesh is serving as an assistant professor at Kerman

Medical University, Iran in Iran. He has several publications on dentistry.