Effect PLA/HA Coating on Dental Implant using Finite Element Method

H. Mas Ayu 1 a, M. M. Mustaqieem 1 b, , A. Shah 2,c d, Andril Arafat 3 d e, M. S. Dambatta

1. Faculty of Mechanical and Automotive Engineering Technology, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia
2. Faculty of Technical and Vocational, Universiti Pendidikan Sultan Idris, 35900 Tanjong Malim, Perak, Malaysia
3. 3Department of Mechanical Engineering, Faculty of Engineering, Universitas Negeri Padang, 25131 Air Tawar Padang, Sumatera Barat, Indonesia
4. Department of Mechanical Engineering, Faculty of Engineering, Kano University of Science and Technology Wudil, P. M. B 3244, Kano State, Nigeria

a masszee@ump.edu.my , b mustaqieem@gmail.com , c armanshah@ftv.edu.my , d arafat@ft.unp.ac.id , e msdmrsdambatta@gmail.com

Abstract:
Finite element analysis (FEA) has been proven to be a precise and applicable method for evaluating dental implant systems. This is because FEA allows for measurement of the stress distribution inside of the bone and various dental implant designs during mastication where such measurements are impossible to perform in-vitro or in-vivo experiment. Therefore, the relation between implant design and load distribution at the implant bone interface is an important issue to understand. This research study focuses on a static simulation and bonding strength for PLA/HA coating on V thread design of dental implant using three-dimensional finite element. The average masticatory muscle that involves in human biting such as X, Y and Z direction will be used to simulate force with load condition of 17.1N, 114.6N and 23.4N respectively. Outcomes from this research provide a better understanding of stress distribution characteristics that would be useful in order to improve design of dental implant thread and evaluation of the PLA/HA bonding strength applied. Based on result obtained, the coated dental implant model is more compatible than uncoated model due to lower maximum stress which is reduce about 16%. The coated model also shows lower deformation and higher bonding strength

Keywords: Dental Implant; PLA/HA Coating; Stress Analysis; Bonding Strength; Finite Element Analysis

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