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AN IMPROVEMENT OF THE DESIGN OF HIP IMPLANT FOR TOTAL HIP REPLACEMENT (THR)

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ABSTRACT

Hip implants are artificial joints that are made of metal, such as titanium or stainless-steel, and have long stems which penetrate deep into the femur canal to hold them in place. We usually use it when there is biological damage in our hip joint. The research also show that the number of person that doing this type of surgical operation are increasing every year especially for the person with age of 65 above. The purpose of this project is to study of an improvement of hip implant and come out with a design that mostly fulfills the aspects for designing a hip implant. There are many aspects to consider in designing hip implant such as stiffness, implantation characteristic and size of the implant. Materials are also one of the most important aspects in designing a hip implant because it controls the materials properties which are important in controlling the stiffness of the implant. The materials that usually use are such as Titanium and Stainless-steel. After review all the aspects from the resources, a design will be carried out with mostly fulfill the requirement. Based on the design, an analysis for the stress and deformation will be generated by using COSMOSWorks Software. The analysis will help in studying the reliability, failure and optimum stress that can be withstand by the designed implant. The result from analysis shows that the FOS value is 1.4. So, this validate that the model can withstand the forces acting on it without causing failure.

Keywords: hip implant; finite element analysis

INTRODUCTION

Hip implants are made of metal, such as titanium or stainless-steel, and have long stems which penetrate deep into the femur canal (center of the thigh bone) to hold them in place. In a surgical operation known as Primary Total Hip Replacement