

Design and Strain Analysis of Artificial Femoral Head & Stem

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Abstract

The majority of elderly patients are subjected to hip bone replacement due to dislocation of bone, mechanical failure and infection. The life time of the implant varies from patient to patient depending on their daily physical activity. Once the implant fails, re-operation of hip bone replacement is performed. In United States, there are approximately 18 revision hip replacements performed for every 100 hip replacements.

In order to avoid the revision of hip replacement, a biocompatible high performing smart materials has to be developed. So, in this work, a artificial femoral head and stem is designed using COMSOL Multiphysics® software. Various biomaterials such as stainless steel, PMMA, Hydroxyapatite, and Titanium alloy with varying composition were studied. The stress strain analysis with different loads was carried out.

Figures used in the abstract

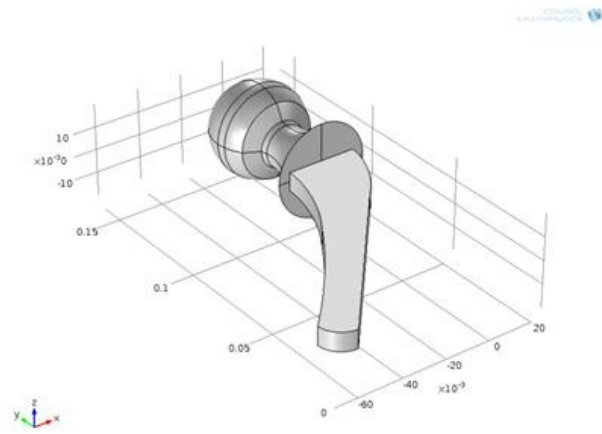


Figure 1: Design of artificial femoral head and stem.