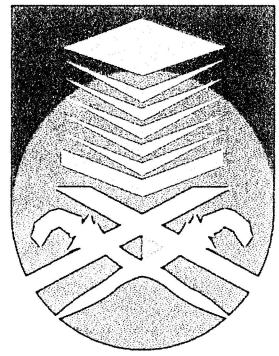

FINITE ELEMENT ANALYSIS OF NITINOL STENT (APPLICATION IN ABDOMINAL AORTA)

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"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their source. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree"

Signed: .....

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ABSTRACT

Stent is a small cylindrical device that is designed to keep open a blocked or narrowing blood vessels or other passageway in a human body. However there are several complications after the insertion of the stent and some of them are related to the design of the stent. Super elastic Nitinol is a common and well known engineering material in the medical industry. It is widely used in the fabrication of the self expanding stent. This paper discusses the properties of nitinol, the problems related to the design and the Finite Element Analysis (FEA) of three different designs of tube-based stent. The analysis was done in order to understand the mechanical behavior of different stent designs under normal physiological pressure. The stent models were subjected to a pressure distribution of 100mmhg which is the mean value of a cyclic arterial pressure. For the first design, the value of the maximum and minimum Von Mises stress obtained are 14700 N/m^2 and 4480 N/m^2 respectively. Meanwhile, for the second design, a maximum value of 15300 N/m^2 and a minimum value of 6280 N/m^2 were obtained for the Von Mises stress. Based on the findings, a new design to overcome the problems related to the stent design was proposed and it was also subjected to a finite element analysis. The maximum value of 18200 N/m^2 and minimum value of 1820 N/m^2 were obtained for the Von Mises stress.

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