



COMPARISON BETWEEN CEMENTED AND CEMENTLESS HIP ARTHROPLASTY UNDER DIFFERENT LOAD CASES

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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 sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree.”

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ABSTRACT

A total hip arthroplasty (THA) is one of the most successful orthopedic procedures performed today that relieves pain from hip arthritis and to improve the quality of life. The purpose of the study is to make the comparison between cemented and cementless hip replacement under different load cases. In this study, finite element analysis (FEA) of the THA was performed. This study is focuses on the static analysis and represents walking and stair climbing activity. The implant used Perfecta design for the cementless and the Exeter design for the cemented hip arthroplasty. Both designs were modeled by using CATIA software while ANSYS software is used for analysis. The Perfecta stem is defined as bio compatibility material that is Titanium alloy Ti-6Al-4V while the Exeter stem material is stainless steel. THA femur was based on cortical bone properties and the analyses were considered for half femur only. The loading that be considered are muscle force and body weight force. The distal end of the femur is fixed. The results were discussed with respect to Von Mises stress of the analysis. The results between cementless and cemented hip arthroplasty were compared with respect to Von Misses stress. Cementless THR represent the best stress distribution compared to cemented THR. Further study by focusing by dynamic analysis is recommended to get more information between the cemented and cementless hip arthroplasty differences.

TABLE OF CONTENTS

CONTENTS	PAGE	
PAGE TITLE	i	
ACKNOWLEDGEMENT	ii	
ABSTRACT	iii	
TABLE OF CONTENTS	iv	
LIST OF TABLES	vii	
LIST OF FIGURES	viii	
CHAPTER I	INTRODUCTION	
1.0	Introduction	1
1.1	Problem Statement	2
1.2	Purpose of the Study	2
1.3	Scope of Work	3
1.4	Significant of the Study	3