

**ANALYSIS OF BIOMECHANICAL STATUS OF THREE
ORTHODONTIC MINISCREW IMPLANTS USING
A FINITE ELEMENT METHOD**

RACHKUL PATANAPORN

**MASTER OF SCIENCE
IN HEALTH SCIENCES**

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

JULY 2013

**ANALYSIS OF BIOMECHANICAL STATUS OF THREE
ORTHODONTIC MINISCREW IMPLANTS USING
A FINITE ELEMENT METHOD**

RACHKUL PATANAPORN

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE
IN HEALTH SCIENCES**

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

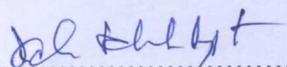
JULY 2013

**ANALYSIS OF BIOMECHANICAL STATUS OF THREE ORTHODONTIC
MINISCREW IMPLANTS USING A FINITE ELEMENT METHOD**

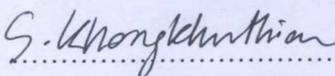
RACHKUL PATANAPORN

THIS THESIS HAS BEEN APPROVED
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN HEALTH SCIENCES

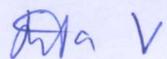
EXAMINING COMMITTEE

.....CHAIRPERSON

Assoc.Prof. Watchara Phetkupt

.....MEMBER

Asst.Prof.Dr. Sakornrat Khongkhunthian

.....MEMBER

Assoc.Prof. Nita Viwattanatipa

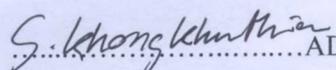
.....MEMBER

Dr. Samroeng In-glam

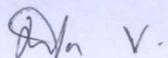
.....MEMBER

Assoc.Prof.Dr. Pathawee Khongkhunthian

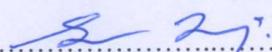
THESIS ADVISORY COMMITTEE

.....ADVISOR

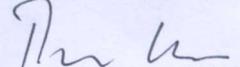
Asst.Prof.Dr. Sakornrat Khongkhunthian

.....CO-ADVISOR

Assoc.Prof. Nita Viwattanatipa

.....CO-ADVISOR

Dr. Samroeng In-glam

.....CO-ADVISOR

Assoc.Prof.Dr. Pathawee Khongkhunthian

18 July 2013

©Copyright by Chiang Mai University

ACKNOWLEDGEMENTS

I must acknowledge many people who have helped me greatly and altered the quality of life throughout my education. First, I would like to express my deep appreciation to Assoc. Prof. Pathawee Khongkhunthian and Assist. Prof. Dr. Sakornrat Khongkhunthian for their supervisions, valuable suggestions and all supports. Also, I would like to thank to Dr. Samroeng Inglam for his encouragement and kindness instructions as same as Assoc. Prof. Dr. Nita Viwattanatipa for all useful consultations. Additional, thank to The Advance Dental Technology Center (ADTEC) which is a part of the National Electronics and Computer Technology Center (NECTEC) for creating the professional research team especially, Mr. Phuwanit Kamtubtim who helped me with technical supports and gave me a chance to learn using a finite element software. This software is very helpful to evaluate the biomechanical status for orthodontic miniscrews. Special thanks would go to The Design and Engineering Consulting Center (DECC) for their kind cooperation. I would also like to thank to staffs at the graduate school, Chiang Mai University especially, Miss Nedchanok Deangchart for her very well participation and management.

Last but not least, I would like to express my deepest gratitude to my family. Especially, the most beloved mom and dad for not only provide me their financial supports but also, constant love and full support but truth and services to mankind. Finally, I would like to thank my husband for his kindly support and encouragement.

Rachkul Patanaporn