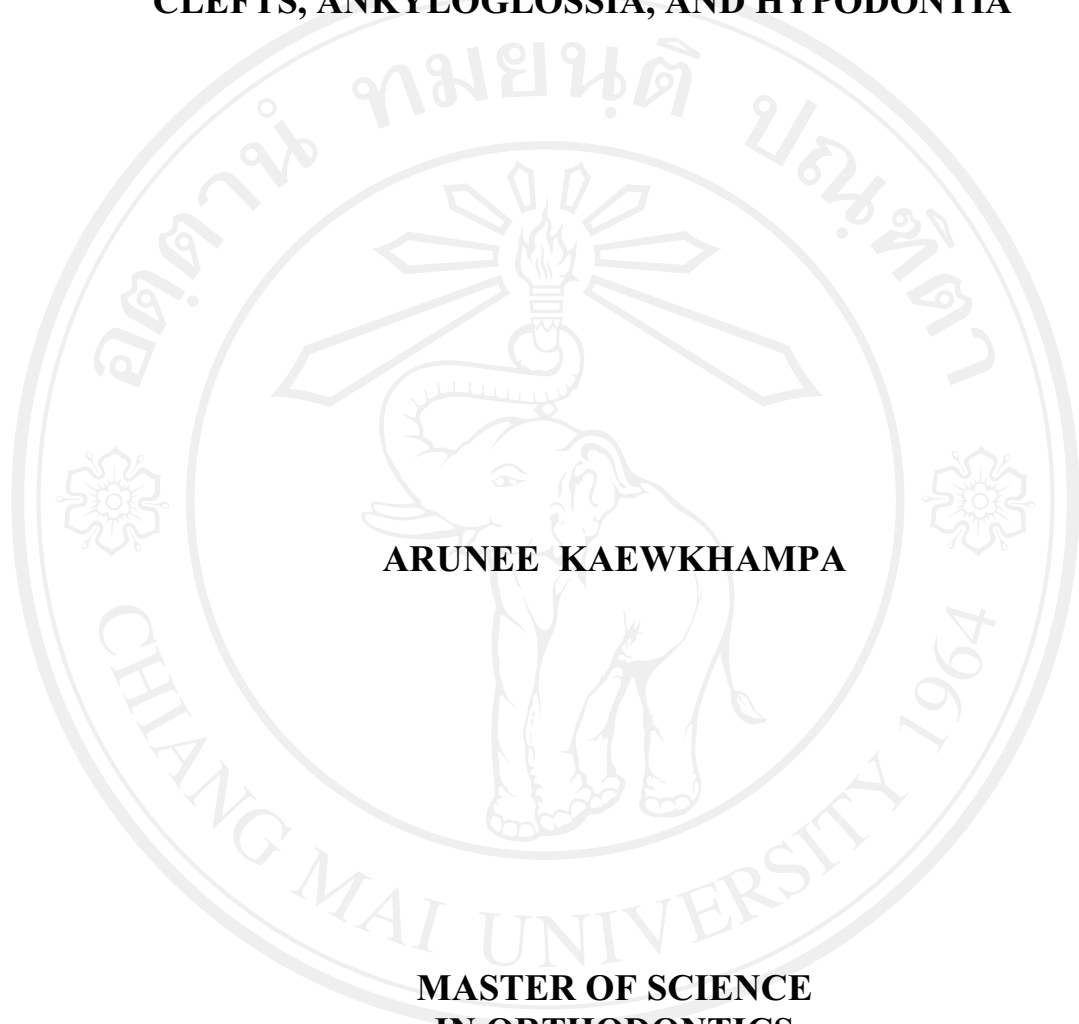


**TBX22 MUTATIONS AND NON-SYNDROMIC OROFACIAL
CLEFTS, ANKYLOGLOSSIA, AND HYPODONTIA**



ARUNEE KAEWKHAMPA

**MASTER OF SCIENCE
IN ORTHODONTICS**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University

All rights reserved

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
DECEMBER 2009**

**TBX22 MUTATIONS AND NON-SYNDROMIC OROFACIAL
CLEFTS, ANKYLOGLOSSIA, AND HYPODONTIA**



ARUNEE KAEWKHAMPA

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

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
DECEMBER 2009**

**TBX22 MUTATIONS AND NON-SYNDROMIC OROFACIAL
CLEFTS, ANKYLOGLOSSIA, AND HYPODONTIA**

ARUNEE KAEWKHAMPA

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

EXAMINING COMMITTEE

Vorasuk Shotelersuk

Prof. Vorasuk Shotelersuk

CHAIRPERSON

D. Jotikasthira

Assoc.Prof. Dhirawat Jotikasthira

MEMBER

Marit Midtbø

Assoc.Prof. Marit Midtbø

MEMBER

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

15 December 2009

© Copyright by Chiang Mai University

ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to my advisors, Associate Professor Dhirawat Jotikasthira and Dr.Piranit Kantaputra, for their helpful guidance, excellent advice and proof-reading of this thesis. I also would like to express my appreciation to Professor M. Kevin O Carroll, Professor Emeritus of the University of Mississippi School of Dentistry and Faculty Consultant at Chiang Mai University Faculty of Dentistry, for his hospitality and assistance in the preparation of the manuscript.

I am grateful to all of my patients and other members of their families for their kind participation in this study. I wish to thank Dr. Kamonporn Nanekrungsan and Dr. Sutti Malaiwijitnond for introducing the interesting cases. I wish to thank Dr. Suwat Kaewkhampa, Dr. Onnida Wattanarat, Dr. Warissara Sripathomsawad, and Ms. Saranya Thawanapong for their help in sample collection. I also wish to thank Dr. Metawee Srikumool for training me in genetic laboratory skills.

I would like to acknowledge the Thailand Research Fund, the European Commission, the Department of Orthodontics, Faculty of Dentistry and The Graduate School, Chiang Mai University, for the financial support that makes this investigation possible.

I would like to acknowledge the Department of Orthodontics and Pediatric Dentistry, and Cranifacial genetics laboratory, Chiang Mai University for facilitating my access to equipment and working places.

Finally, I deeply appreciate my parents and my husband for their love and care. Their support and encouragement provided the impulse for my achievement, and for that I will be forever grateful.

Arunee Kaewkhampa



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved