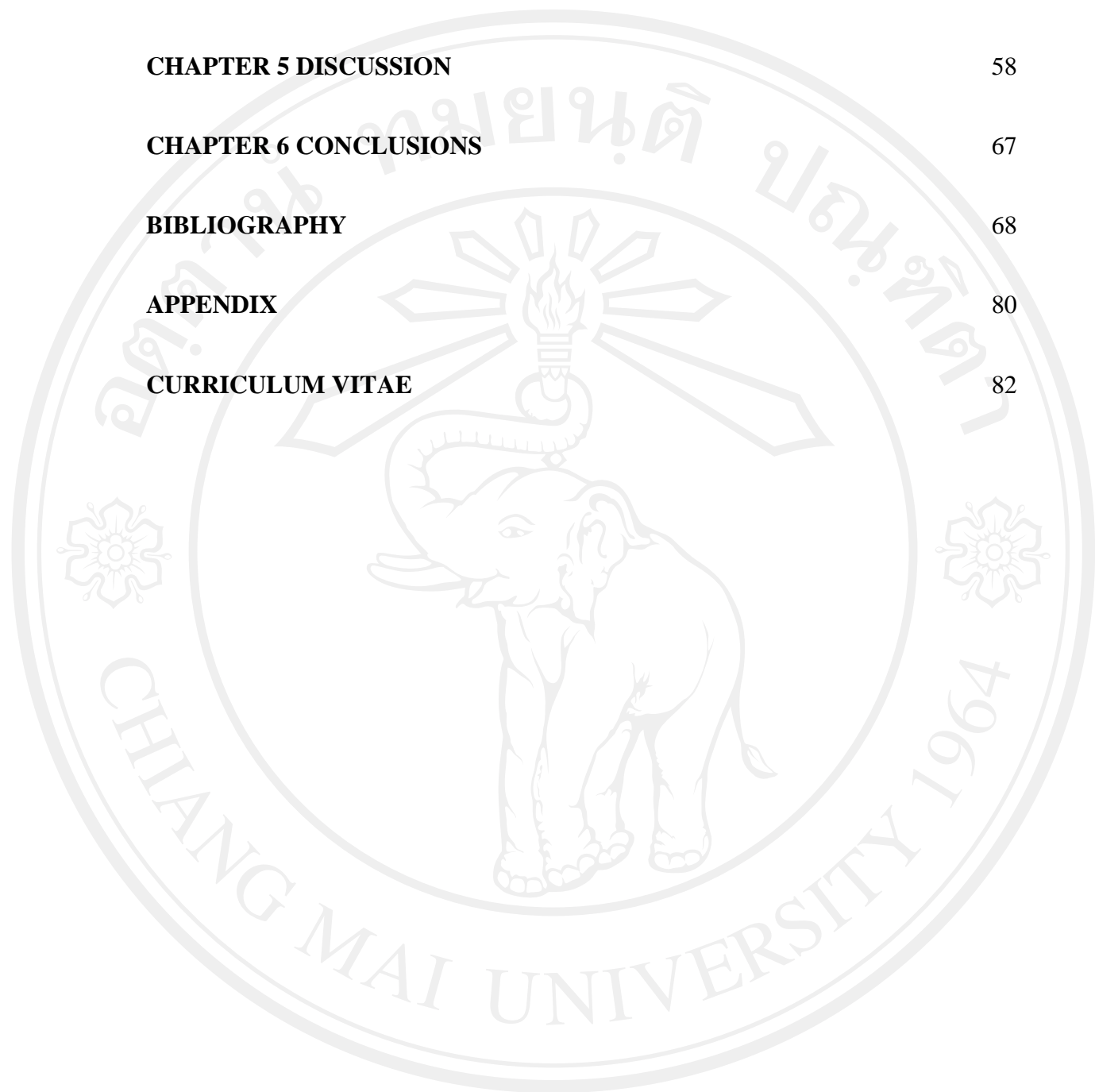


## TABLE OF CONTENTS

	Page
<b>ACKNOWLEDGEMENTS</b>	iii
<b>ABSTRACT (THAI)</b>	v
<b>ABSTRACT (ENGLISH)</b>	vii
<b>LIST OF TABLES</b>	xii
<b>LIST OF FIGURES</b>	xiii
<b>CHAPTER 1 INTRODUCTION</b>	1
1.1 Rationale	1
1.2 Objective	2
1.3 Hypothesis	2
<b>CHAPTER 2 REVIEW OF THE LITERATURE</b>	3
2.1 Dentin	3
2.1.1 Dentinogenesis	3
2.1.2 Dentin structure	4
2.1.3 Components of dentin	6

2.1.4 Dentin in primary teeth	7
2.2 Dentinal tubules	8
2.2.1 Dentinal tubules in primary teeth	8
2.2.2 Dentinal tubules in permanent teeth	10
2.3 Dentin permeability	11
2.4 Pulpal pressure	15
2.5 Effect of dentin structure and pulpal pressure to adhesive materials	17
2.6 Dental adhesives	19
2.7 Bond strength tests	24
2.8 Thermocycling	27
<b>CHAPTER 3 MATERIALS AND METHODS</b>	29
3.1 Sample collection	29
3.2 Tooth preparation	30
3.3 Preparation of dentin surface	32
3.4 Preparation tooth for determining the modes of failure	38
3.5 Processing for Scanning Electron Microscope	39
3.6 Statistical Analysis	40
<b>CHAPTER 4 RESULTS</b>	41

<b>CHAPTER 5 DISCUSSION</b>	58
<b>CHAPTER 6 CONCLUSIONS</b>	67
<b>BIBLIOGRAPHY</b>	68
<b>APPENDIX</b>	80
<b>CURRICULUM VITAE</b>	82



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University  
All rights reserved

## LIST OF TABLES

Table		Page
1	The number of dentinal tubules and tubule diameter of permanent tooth	10
2	Mode of application, compositions, and manufacturer of tested adhesive	34
3	The mean $\pm$ SD values of microtensile bond strength of dry teeth, -30, 0 and 30 cmH <sub>2</sub> O group from 40 lower primary incisor teeth	41
4	The values of load and microtensile bond strength of all specimens in the group of dry teeth	43
5	The individual values of load and microtensile bond strength of the -30 cmH <sub>2</sub> O group	45
6	The values of load and microtensile bond strength of all specimens of the 0 cmH <sub>2</sub> O group	47
7	The individual values of load and microtensile bond strength of 30 cmH <sub>2</sub> O group	49

## LIST OF FIGURES

Figure		Page
1	Equation of Poiseuille's law	12
2	Prolonged retention of lower anterior primary teeth	29
3	Root section	30
4	The tooth was stuck to Perspex collar	31
5	Connecting the collar to water manometer	32
6	Scotchbond™ Etchant #7423 (3M, ESPE) and Adper™ Single Bond 2-step total-etch adhesive (3M, ESPE)	33
7	Samples were prepared for microtensile bond strength test	35
8	Universal Testing Machine (UTM)	36
9	Universal Testing Machine (UTM) with the tensile bond testing apparatus	36
10	A specimen was fixed to the tensile bond testing apparatus	37
11	Separated teeth	38
12	A Scanning Electron Microscope (JOEL® JSM-5410LV; JEOL, Tokyo, Japan)	39
13	A gold palladium coater machine	39
14	Samples were coated with gold palladium	40
15	The means and SD values of microtensile bond strength in the form of bar charts	42

16	The linear graph of microtensile bond strength values of each specimen in dry teeth group	44
17	The linear graph of microtensile bond strength values of each specimen in the -30 cmH <sub>2</sub> O group	46
18	The linear graph of microtensile bond strength values of each specimen in the in the 0 cmH <sub>2</sub> O group	48
19	The linear graph of microtensile bond strength values of each specimen in the 30 cmH <sub>2</sub> O group	50
20	An example of graphs in the group of dry teeth which load at 9.68 N caused the failure in bonding	51
21	An example of graphs in the group of -30 cmH <sub>2</sub> O which load at 9.17 N caused the failure in bonding	52
22	An example of graphs in the group of 0 cmH <sub>2</sub> O which load at 8.59 N caused the failure in bonding	52
23	An example of graphs in the group of 30 cmH <sub>2</sub> O which load at 4.75 N caused the failure in bonding	53
24	Example of scanning Electron Micrograph shows mode of failure in the group of dry teeth which was taken from magnification of $\times 1,000$	54
25	Example of scanning Electron Micrographs show mode of failure in the group of -30 cmH <sub>2</sub> O which was taken from magnification of $\times 1,000$	55

- 26 Example of scanning Electron Micrographs show mode of failure in the group of 0 cmH<sub>2</sub>O which was taken from magnification of  $\times 1,000$  56
- 27 Example of scanning Electron Micrographs show mode of failure in the group of 30 cmH<sub>2</sub>O which was taken from magnification of  $\times 1,000$  57