

## 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 I INTRODUCTION</b>	1
Principles, Theories, and Rationales	1
Purposes of the study	2
Hypotheses	2
Anticipated benefits	3
Definitions	3
<b>CHAPTER II LITERATURE REVIEW</b>	4
Dental fluorosis	4
Conventional phosphoric acid adhesive systems	15
Etching pattern	18
Effect of fluorosis on bond strength	21
Adhesive resin cement	22
<b>CHAPTER III MATERIALS AND METHODS</b>	24
Materials	24

	<b>Page</b>
Methods	30
Statistical analyses	40
<b>CHAPTER IV RESULTS</b>	<b>42</b>
Shear bond strength values	42
Failure modes	45
<b>CHAPTER V DISCUSSION</b>	<b>49</b>
<b>CHAPTER VI CONCLUSIONS</b>	<b>57</b>
<b>BIBLIOGRAPHY</b>	<b>59</b>
<b>APPENDIX</b>	<b>67</b>
<b>CURRICULUM VITAE</b>	<b>69</b>

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
2.1 Dean's fluorosis index	11
2.2 Thylstrup and Fejerskov's fluorosis index	13
3.1 Study group characteristics	33
4.1 Shear bond strength values of the adhesive systems	42
4.2 Two-way ANOVA	44
4.3 Post Hoc Tests	44
4.4 Numbers and percentages of failure sites of three different adhesive systems	45

## LIST OF FIGURES

Figure	Page
2.1 Types of severity of dental fluorosis	4
2.2 Electron micrograph of enamel crystals	6
2.3 Scanning electron micrograph of partially demineralized enamel	6
2.4 Scanning electron micrograph obtained from the highly mineralized surface layer of enamel	7
2.5 Transmission electron micrograph of cross-cut crystals obtained from the highly mineralized surface layer	7
2.6 Scanning electron micrographs obtained from the hypomineralized areas	8
2.7 Porous part of fluorosis	9
2.8 Diagrammatic illustration of the clinical features of dental fluorosis	15
2.9 Scanning electron micrographs of etching patterns in enamel	19
2.10 Scanning electron microscope photomicrograph of fluorosis	20
2.11 Scanning electron microscopy (SEM) images of enamel surfaces treated with Clearfil SE bond primer	20
2.12 Molecular structure of the 4-META monomer	23
3.1 Standard edgewise premolar brackets 0.018" x 0.025" slot	25
3.2 Conventional phosphoric acid etching system (System 1+)	25
3.3 Conventional phosphoric acid etching system (Unite)	26

	<b>Page</b>
3.4 Adhesive resin cement (Superbond C&B)	26
3.5 Cylindrical polyvinylchloride ring	27
3.6 Universal testing machine (Instron <sup>®</sup> )	27
3.7 De-bonding plate	28
3.8 Mounting jig	28
3.9 De-bonding plate, mounting jig and tooth with bracket	28
3.10 Incubator	29
3.11 Thermocycling device	29
3.12 Computer-generated transparent grid	30
3.13 Method of sectioning of the roots with carborundum discs	31
3.14 A 0.018” X 0.025” stainless steel wire was place on the bracket slot by ligating the elastic ligature to the body of the bracket	34
3.15 Acrylic resin used in this study	34
3.16 Tooth embedded in polyvinylchloride ring after removal of the elastic ligature, the wire, and the plastic sheath	35
3.17 500-newton load cell	36
3.18 The de-bonding plate was fixed into the upper pneumatic grip and the mounting jig was fixed into the lower pneumatic grip	37
3.19 Apparatus assembled for testing shear bond strength	38
3.20 Photograph of de-bonded bracket surface area	39
3.21 Residual adhesive amounts at the de-bonded bracket surfaces were determined by using a computer-generated transparent grid	40

	<b>Page</b>
4.1 Histogram of the means and standard deviations of shear bond strength values of the different adhesive systems	43
4.2 Histogram of adhesive remnant index scores of the different adhesive systems	46
4.3 Adhesive failures at the enamel/adhesive interface	47
4.4 Cohesive failures within the adhesive	48
4.5 Adhesive failures at the adhesive/bracket interface	48