

CHAPTER IV

RESULTS

The statistics describing the shear bond strength values of orthodontic precoated or uncoated ceramic brackets bonded to teeth with the total-etching adhesive system, the two-step or the one-step self-etching adhesive systems are shown in Table 4. The total-etching adhesive system with precoated ceramic brackets (Group 2) provided the highest mean shear bond strength value of 11.08 ± 3.34 MPa. The total-etching adhesive system with uncoated ceramic brackets, the two-step self-etching adhesive system with precoated ceramic brackets, the one-step self-etching adhesive system with precoated ceramic brackets and the two-step self-etching adhesive system with uncoated ceramic brackets, provided mean shear bond strength values of 8.65 ± 1.41 , 7.47 ± 1.63 , 7.22 ± 2.62 , and 7.06 ± 1.80 MPa, respectively, whereas the one-step self-etching adhesive system with uncoated ceramic brackets (Group 5) provided the lowest mean shear bond strength value of 6.35 ± 2.24 MPa.

Table 4 Means, standard deviations and ranges of shear bond strength values of total-etching, two-step self-etching and one-step self-etching adhesive systems with uncoated and precoated ceramic brackets

Group	Shear Bond Strength (MPa)			
	Mean	SD	Min	Max
Group 1 Phosphoric acid + Clarity™ ceramic brackets	8.65	1.41	4.43	9.92
Group 2 Phosphoric acid + APC Plus Clarity™ ceramic brackets	11.08	3.34	5.17	15.55
Group 3 Clearfil SE bond + Clarity™ ceramic brackets	7.06	1.80	3.82	9.90
Group 4 Clearfil SE bond + APC Plus Clarity™ ceramic brackets	7.47	1.63	5.11	10.73
Group 5 Clearfil S ³ bond + Clarity™ ceramic brackets	6.35	2.24	2.26	9.86
Group 6 Clearfil S ³ bond + APC Plus Clarity™ ceramic brackets	7.22	2.62	4.02	13.67

The two-way ANOVA did not detect interaction between adhesive systems and types of bracket. On the other hand, both main effect analyses were statistically significant at $p < 0.05$. These indicated that the mean shear bond strength values of precoated ceramic brackets were different from those of uncoated ceramic brackets, regardless of bonding system. Also, the mean shear bond strength values of the bonding systems were different from one another. The ANOVA is shown in Table 5.

Table 5 Two-way analysis of variance (Two-way ANOVA) of types of bracket and bonding adhesive system

Source of Variation	Sum of			F-value	Mean Level
	Squares	df	Square		
Corrected Model	288.380 ^a	5	57.676	11.070	0.000
Intercept	7625.797	1	7625.797	1463.596	0.000
Bracket	45.756	1	45.756	8.782	0.004*
Bonding	220.120	2	110.060	21.123	0.000*
Bracket and bonding	22.504	2	11.252	2.160	0.120
Error	593.976	114	5.210		
Total	8508.154	120			
Corrected total	882.356	119			

a. R squared = .327 (Adjusted R squared= .297)

* Significant $p < 0.05$

Tukey's HSD test was used to determine the statistical difference in mean shear bond strength values between adhesive systems. There were statistically significant differences ($p < 0.05$) between the total-etching adhesive system and the two-step self-etching adhesive system, and between the total-etching adhesive system and the one-step self-etching adhesive system in both uncoated ceramic brackets and precoated ceramic brackets. However, there was no statistically significant difference ($p < 0.05$) between the two-step and the one-step self-etching adhesive system in either uncoated ceramic brackets or precoated ceramic brackets, as shown in Table 6.

Table 6 Tukey's HSD test of shear bond strength values

	Phosphoric acid	Clearfil SE bond	Clearfil S ³ bond
Phosphoric acid	-	*	*
Clearfil SE bond	*	-	-
Clearfil S ³ bond	*	-	-

* Significance level $p < 0.05$

The frequency distributions of Adhesive Remnant Index scores of each group are shown in Table 7. The Kruskal-Wallis test detected statistically difference in Adhesive Remnant Index scores among group of experiments ($p < 0.01$) as shown in Table 8.

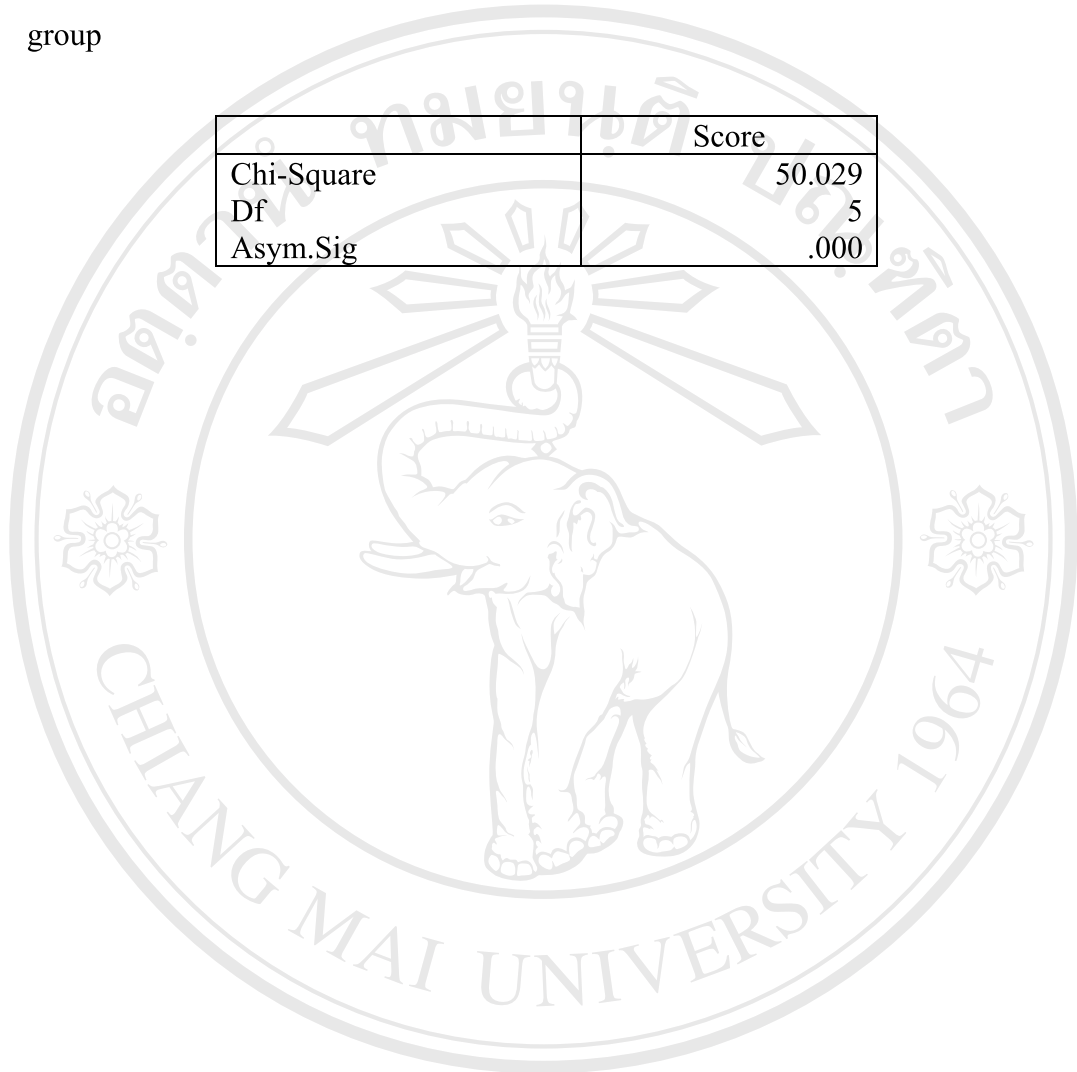
Table 7 Frequency distributions of the Adhesive Remnant Index scores of each group

Group	n	ARI scores			
		0	1	2	3
Group 1 Phosphoric acid + Clarity™ ceramic brackets	20	0 (0%)	2 (10%)	0 (0%)	18 (90%)
Group 2 Phosphoric acid + APC Plus Clarity™ ceramic brackets	20	2 (10%)	9 (45%)	8 (40%)	1 (5%)
Group 3 Clearfil SE bond + Clarity™ ceramic brackets	20	7 (35%)	7 (35%)	3 (15%)	3 (15%)
Group 4 Clearfil SE bond + APC Plus Clarity™ ceramic brackets	20	8 (40%)	11 (55%)	1 (5%)	0 (0%)
Group 5 Clearfil S ³ bond + Clarity™ ceramic brackets	20	4 (20%)	12 (60%)	3 (15%)	1 (5%)
Group 6 Clearfil S ³ bond + APC Plus Clarity™ ceramic brackets	20	4 (20%)	16 (80%)	0 (0%)	0 (0%)

ARI scores : 0, no adhesive left on tooth; 1, less than half of adhesive left on tooth; 2, more than half of adhesive left on tooth; 3, all adhesive left on tooth with a distinct impression of the bracket base.

Table 8 Kruskal-Wallis test of the Adhesive Remnant Index scores of each group

	Score
Chi-Square	50.029
Df	5
Asym.Sig	.000



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