

CHAPTER VI

CONCLUSIONS

The purposes of this study were to determine and compare both the shear bond strengths and the failure modes after debonding among three self-etching (ED PRIMER[®], AdheSE[®] and Xeno[®] III) and one conventional phosphoric acid etching adhesive systems in orthodontic bracket placement. The failure modes were assessed from the failure sites and the amount of residual adhesives on deboned enamel surfaces.

The conclusions are presented as follows:

1. Mean shear bond strengths of the self-etching (Xeno[®] III, ED PRIMER[®] and AdheSE[®]) and conventional phosphoric acid etching adhesive systems were 1.48, 3.98, 1.74 and 9.45 MPa respectively. The conventional phosphoric acid etching adhesive system had a significantly greater shear bond strength than the three self-etching adhesive systems at $p < 0.001$.
2. Three self-etching adhesive systems had inadequate shear bond strengths for clinical orthodontic use. The conventional phosphoric acid etching adhesive system is still appropriate for use in orthodontic bracket placement.
3. The failure sites of the three self-etching and one conventional phosphoric acid adhesive systems were mostly found at the adhesive/enamel interface, but were not found within enamel or within the bracket.
4. The percentages of failure sites at the adhesive/enamel interface of the three self-etching (Xeno[®] III, ED PRIMER[®] and AdheSE[®]) and one conventional phosphoric acid etching adhesive systems were 93.8, 56.2, 78.1 and 53.1 respectively. Xeno[®] III had significantly greater percentages of failures sites at this interface than the conventional phosphoric acid adhesive system and ED PRIMER[®] at $p < 0.001$ and $p = 0.001$ respectively.

5. The percentages of failure sites within the adhesive of the three self-etching (Xeno[®] III, ED PRIMER[®] and AdheSE[®]) and one conventional phosphoric acid etching adhesive systems were 0, 34.4, 18.8 and 28.1 respectively. The conventional phosphoric acid adhesive system, ED PRIMER[®] and AdheSE[®] had significantly greater percentages of this site than Xeno[®] III at $p=0.004$, $p<0.001$ and $p=0.032$ respectively.

6. The percentages of failure sites at adhesive/bracket interface of the three self-etching (Xeno[®] III, ED PRIMER[®] and AdheSE[®]) and one conventional phosphoric acid etching adhesive systems were 6.2, 9.4, 3.1 and 18.8 respectively.

7. Mean rank of the amount of residual adhesives on debonded enamel surfaces of the three self-etching (Xeno[®] III, ED PRIMER[®] and AdheSE[®]) and one conventional phosphoric acid etching adhesive systems were 41.33, 78.09, 53.69 and 84.89 respectively. The conventional phosphoric acid adhesive system had significantly greater residual adhesives than two self-etching (Xeno[®] and AdheSE[®]) adhesive systems at $p<0.001$ and $p=0.001$ respectively. Likewise, the self-etching adhesive system, ED PRIMER[®] III, had significantly greater residual adhesives than those two self-etching adhesive systems at $p<0.001$ and $p=0.008$ respectively.