Direct and indirect bonding of wire retainers to bovine enamel using three resin systems: shear bond strength comparisons

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Objective: We compared the shear bond strength (SBS) of lingual retainers bonded to bovine enamel with three different resins using direct and indirect methods. Methods: Both ends of pre-fabricated twisted ligature wires were bonded to bovine enamel surfaces using Light-Core, Tetric N-Flow, or Transbond XT. Phosphoric acid-etched enamel surfaces were primed with One-Step prior to bonding with Light-Core or Tetric N-Flow. Transbond XT primer was used prior to bonding with Transbond XT. After 24 hours in water at 37°C, we performed SBS tests on the samples. We also assigned adhesive remnant index (ARI) scores after debonding and predicted the clinical performance of materials and bonding techniques from Weibull analyses. Results: Direct bonding produced significantly higher SBS values than indirect bonding for all materials. The SBS for Light-Core was significantly higher than that for Tetric N-Flow, and there was no significant difference between the direct bonding SBS of Transbond XT and that of Light-Core. Weibull analysis indicated Light-Core performed better than other indirectly bonded resins. Conclusions: When the SBS of a wire retainer is of primary concern, direct bonding methods are superior to indirect bonding methods. Light-Core may perform better than Transbond XT or Tetric N-Flow when bonded indirectly. (Korean J Orthod 2011;41(6):447-453)

Key words: Lingual bonded retainer, Shear bond strength, Direct and indirect bonding

INTRODUCTION

Relapses following orthodontic treatment are unpredictable.1,2 Research into these relapses has frequently centered on the lower anterior teeth segment, where relapses most often occur.3 While lingual bonded retainers are considered to be the most suitable method of retention, the effectiveness of this method is still controversial.4 Recent research suggests that long-term retention of the lower anterior segment may be necessary in order to prevent or reduce unwanted post-treatment changes.5

Fixed lingual multistrand retainers have long been available as a method of orthodontic retention6 and a number of different designs and techniques for bonding having been suggested.7,8 This type of retainer allows physiologic tooth movement while maintaining tooth alignment.6

There are two primary approaches to bonding fixed lingual retainers: direct bonding and indirect bonding. Compared with direct bonding, indirect bonding of these retainers requires less chair time, etched surfaces