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# 学位論文内容の要旨

博士の専攻分野の名称 博士(歯学) 氏名 王 林 紅

学 位 論 文 題 名

## **Effect of an extra hydrophobic resin layer on the bond strength of universal adhesives**

(ユニバーサルアドヒーズの接着に対する疎水性ボンディング材の影響)

**キーワード(5つ) universal adhesive, primer, extra hydrophobic resin layer, microtensile bond strength, nanoleakage.**

The bond strength and durability of some one-step self-etch adhesives can be benefit from the application of an extra hydrophobic resin layer (EHL). The effect of EHL on different universal adhesives (UAs) and whether UAs can work as a primer is still unknown. One hundred and nineteen extracted non-carious human molars were used in this study. The flat dentin surfaces were exposed, polished with 600-grit SiC paper and randomly allocated into 7 groups and 14 subgroups. Three different pH UAs, G-Premio Bond (GPB), Scotchbond Universal (SBU), All-Bond Universal (ABU) were used in this study, while the bonding agent of Clearfil SE Bond 2 (SE2) was selected as EHL, and SE2 was chosen as a control group. The microtensile bond strength ( $\mu$ TBS), as well as the fracture modes, interfacial structures and nanoleakage (NL) were evaluated after 24 h water storage and after 15,000 thermal cycling (TC). Elastic modulus (EM) and hardness (H) was tested by a nanoindenter. Three-way ANOVA was done to determine the interaction effect of  $\mu$ TBS, and comparison between groups were performed using one-way ANOVA, followed by Games-Howell test. The interaction effect of EM and H were analyzed using two-way ANOVA, and comparison between groups were performed using one-way ANOVA, followed by Tukey's test. Significantly higher  $\mu$ TBS was achieved in GPB+EHL group compared with GPB group both at 24 h and after 15,000 TC. The additional use of EHL did not significantly improve the  $\mu$ TBS of SBU and ABU groups both at 24 h and after 15,000 TC. After 15,000 TC, the bond strength of GPB+EHL, SBU, SBU+EHL, ABU+EHL and SE2 group significantly decreased compared with the 24 h groups, while no significant difference was found within GPB and ABU groups. Many bubbles were found in GPB group both at 24 h and after 15,000 TC, while the bubble formation was rare in other groups. GPB group showed more NL than SE2 both at 24 h and 15,000 TC, while the GPB+EHL group demonstrated lower NL than GPB group. The mean EM and H of adhesive layer in GPB+EHL group was significantly decreased compared with GPB group. This results indicated that the bonding effectiveness of low pH one-step UA (GPB) were significantly improved by additional application of EHL both at 24 h and after 15,000 TC, while no significant improving effect for ultra-mild one-step UAs (SBU and ABU), GPB works well as a primer in a two-step bonding system while SBU, ABU does not work well.