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Alternative technique of solvent volatilization and effects on the degree of conversion of dental adhesive systems

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Inadequate solvent evaporation may be considered a most serious error during the dental adhesive procedure. Thus, the aim of this study was to evaluate the influence of different times (5s, 10s, 20s) and temperatures (±23o, ±40oC) on volatilization of dental adhesive systems containing different solvents [Excite (EX): ethanol solvent; One Step (OS): acetone; and Single Bond 2 (SB): ethanol and water] on the degree of conversion (DC). The light curing unit Elipar FreeLight 2– LED was used for curing the samples by 20s. For measurement of DC (n = 5), after volatilization, were dispensed 3 µL of each dental adhesive on the crystal and used Fourier Transform Infrared transmission Spectroscopy (FTIR) in the range from 1665 to 1580 cm-1. The data were subjected to three factors ANOVA and Tukey test ($p < 0.05$). For time of volatilization, there was no statistically significant difference of the dental adhesives studied inside each temperature group, with the exception of SB group volatilized by 10s that showed better DC. For EX, there was no statistically significant difference between the times and temperatures for volatilization studied. For OS, higher values of DC were obtained with temperature of ±40oC in all times of volatilizations evaluated. For SB, higher values of DC were obtained with temperature of ±40oC with the exception of the group volatilized of 20s, which did not differ from temperature of ±23oC. EX presented higher values of DC followed by SB and OS, regardless of time and temperature of volatilization. The results of this dental adhesive study indicate that there is a superiority of ethanol-based adhesive on those that are acetone-based or where there is the association of ethanol and water. And, volatilization at high temperature of dental adhesive systems based on acetone or water and ethanol, has raised its DC.