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Marginal micro-leakage of cervical composite resin restorations bonded using etch-and-rinse and self-etch adhesives: two dimensional vs. three dimensional methods

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Objectives: This study was evaluated the marginal microleakage of two different adhesive systems before and after aging with two different dye penetration techniques.

Materials and Methods: Class V cavities were prepared on the buccal and lingual surfaces of 48 human molars. Clearfil SE Bond and Single Bond (self-etching and etch and-rinse systems, respectively) were applied, each to half of the prepared cavities, which were restored with composite resin. Half of the specimens in each group underwent 10,000 cycles of thermocycling. Microleakage was evaluated using two dimensional (2D) and three dimensional (3D) dye penetration techniques separately for each half of each specimen. Data were analyzed with SPSS 11.5 (SPSS Inc.), using the Kruskal-Wallis and Mann-Whitney U tests ($\alpha = 0.05$).

Results: The difference between the 2D and 3D microleakage evaluation techniques was significant at the occlusal margins of Single bond groups ($p = 0.002$). The differences between 2D and 3D microleakage evaluation techniques were significant at both the occlusal and cervical margins of clearfil SE Bond groups ($p = 0.017$ and $p = 0.002$, respectively). The difference between the 2D and 3D techniques was significant at the occlusal margins of non-aged groups ($p = 0.003$). The difference between these two techniques was significant at the occlusal margins of the aged groups ($p = 0.001$). The Mann-Whitney test showed significant differences between the two techniques only at the occlusal margins in all specimens.

Conclusions: Under the limitations of the present study, it can be concluded that the 3D technique has the capacity to detect occlusal microleakage more precisely than the 2D technique.

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