Cytotoxicity evaluation of self-etching dentine bonding agents in a cell culture perfusion condition

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ABSTRACT

Objective: The aim of this study was to evaluate the cytotoxicity of three dentine bonding agents (G-Bond, Clearfil S^3 Bond and Clearfil SE Bond X) in cell-culture perfusion.

Methods: In this experiment, $8x10^4$ TCPC SV40 cells (bovine-pulp-derived cells transfected with simian virus 40 large T-antigen) in MEM-alpha media, 20%FCS were seeded on mesh in a 6-well plate and incubated at 37 °C with 5% CO_2. After 2 days, the mesh inserts were transferred to a 24-well plate and incubated in MEM-alpha media, 20%FCS with 50 µg/ml of ascorbic acid at 37 °C with 5% CO_2 for 14 days. The test materials were applied to the dentine discs of dentine barrier models. Three-dimensional cell cultures in mesh and perfusion conditions were generated in this experiment. Each material, as well as the negative control (President) and the positive control (vitrebond), was tested in 5 models with the tests repeated in triplicate. The MTT assay was used to determine cell viability after the diffusion of leachable toxicity from the tested materials through the dentine discs.

Results: The cell survival rate with G-Bond and Clearfil S^3 Bond was 113.03 and 90.98 percent, respectively, whereas that with Clearfil SE Bond X was 111.83 percent. All three dentine bonding agents had no toxicity compared with the negative control group ($P>.05$).

Conclusions: All three self-etching dentine-bonding agents are nontoxic. Pulp damage caused by these three bonding agents is unlikely to occur in the clinic. (Eur J Dent 2012;6:408-414)

Key words: Cytotoxicity; MTT assay; perfusion condition; three-dimensional cell cultures