Reliability of in vitro microleakage tests: a literature review.


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Abstract
PURPOSE: The literature contains conflicting data about in vitro microleakage evaluations and their usefulness and reliability. No standardization has yet been established. Here we consider features of published studies that might affect the results of the in vitro microleakage tests.

MATERIALS AND METHODS: We reviewed 144 in vitro microleakage studies, published in 14 international reviews between 1992 and 1998, which comprised 917 sets or groups of experiments. The published studies were entered in a database and compared using selected literature criteria: sample, cavities, restoration procedures, thermocycling and mechanical cycling, evaluation method.

RESULTS: The methods employed vary widely. The most frequent methodological choices (%) were (1) specimen storage after extraction: duration (unspecified, 59.2), medium (distilled or deionized water, 33.8), temperature (unspecified, 52.2), additives (none, 47.0); (2) aging method (79.1): duration before aging (< 24 h, 35.9); medium and temperature of storage before aging (distilled or deionized water, 26.8; 37 degrees C, 54.3); (3) medium of cycling (tap water, 50.5), number of cycles ([250-500], 34.6), number of baths (2, 84.0), bath temperature (5 degrees C to 55 degrees C, 60.6), immersion dwell time (30 s, 44.3); (4) tracer: type (basic fuchsin, 40.7), time of immersion (after thermocycling and/or mechanical cycles, 64.1), immersion duration (basic fuchsin: 24 h, 59.5); assessment of dye penetration of sections (91.7): direction (perpendicular, 88.5), number (1, 47.1).

CONCLUSION: The great variability in the methods used in these 144 studies prevented meta-analysis and comparison of the results, thus reducing the value of these methods.