Back to the Future

Dear Readers and Authors,

In a very well written article, recently published in *The Journal of Adhesive Dentistry*,* Franklin Tay and David Pashley described various scientific pathways which may lead to completely new generations of adhesives. However, one should note that adhesives called 5th, 6th, and certainly even 7th generation are no more than an evolution of the basic concept of total etching, which has been accepted by the profession for a little more than a decade. The functional monomers are still methacrylic esters. No matter which system is used, the basic principle remains unchanged: the adhesive system forms a hybrid layer after superficial demineralization, infiltration, and polymerization. The global concept of adhesion to enamel and dentin has not changed, and the classification according to generations is more a sales argument than a scientific one.

Certainly, the packaging and delivery mode of the products have changed in order to theoretically increase the comfort and ease of application and thus make them more forgiving. Some adhesives recently introduced onto the market seem to have at least some advantages. For example, the so-called self-etching primers seem to reduce the postoperative sensitivity. This observation, reported by the majority of users, will only become evidence after it has been proven in an independent clinical trial. Meanwhile, my experience, gathered during continuing education courses of French general dental practitioners, demonstrates that with the most "modern" systems it is not possible to reduce the coefficient of variance of the mean bond strength below 30%! Of course, this 30% is the expression of a number of factors not accounted for, eg, the variance of the substrate. However, considering that these shear bond strength tests were performed on sound dentin, one may expect an even larger coefficient of variance in real life, where we bond to all kinds of dentin (sclerotic, demineralized, even caries-affected). Therefore, user sensitivity remains the Achilles heel of all adhesive systems, and the quality and precision of their clinical use is the true key to success or failure.

The great advantage of these practical continuing education courses for practitioners is that they demonstrate the large discrepancy between the results of biomaterials (adhesives) as applied by experts or as applied under the conditions of clinical reality. Therefore, besides the technological improvement of these products, there is simultaneously a definite need for great efforts in training the target population: the general practitioner! Today's adhesive dentistry must be based on solid theoretical knowledge. The dentist who has learned and understood the true mechanisms of adhesion of biomaterials to dental tissues will always be able to adapt to the evolution and the further development of these products.

This will be true for the coming years, while the profession waits – back to the future – for the advent of a "smart" material able to adapt itself to every clinical situation and even having the potential for "self-repair." We must leave it to the future when biotechnology will replace the classical chemistry for the production of new biomaterials. Only then will the general dental practitioner be able to trust these new materials. It will be a bit like driving automobiles: Today's cars can be reliably and safely driven without knowing how the engine functions. In dentistry today, however, we must know how the "engine" works. Therefore, let us accomplish this vital educational task for the benefit of our patients.

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*Tay FR, Pashley DH. Dental adhesives of the future. J Adhesive Dent 2002;4:91-101.