

NEW PRODUCT

review

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3M SINGLE BOND DENTAL ADHESIVE SYSTEM

Over the years, dental adhesive systems have flooded the market providing the clinician with a myriad of options from which to choose. Close to 80 different systems are currently available worldwide. Along with these many options came confusion on the part of dentists seeking to understand which adhesive system would best suit their needs. Since most of the restorative procedures are performed adhesively, it is understandable why we should be concerned about choosing the right bonding agent to ensure predictable success is achieved time after time in our daily practice.

Dental adhesive systems have evolved from simple enamel-bonding agents using the acid etch technique in the 1960s to today's universal systems that allow us to bond to composite, porcelain, and metal alike. Several generations of adhesive systems have gone by, each showing some improvement over its predecessor. Basically, since bonding to enamel has always been predictable, the major focus of most, if not all systems, has been to produce a product that would elicit long lasting, predictably high bond strengths to the dentinal surface while keeping microleakage totally under control (Figure 1). I guess the question here would be: is there such

a product available? The answer is: we are getting there. There is sufficient reported scientific data, both *in vivo* and *in vitro*, to support us clinically when we etch dentin and apply a dentin adhesive over it. But how can you tell you've achieved clinical success when bonding to dentin? We can't test every restoration on an Instron machine to measure bond strengths nor can we examine its interface under a SEM to determine whether the intertubular and the peritubular dentin (demineralized zone) have been thoroughly saturated to form a solid micromechanical lock. What then? Should we be discouraged by this uncertainty? Certainly not! How do we measure clinical success? Clinical success translates primarily into the absence of post-operative sensitivity and microleakage associated with tooth reinforcement and restoration retention. As critical as it may present itself, bonding to dentin can be quite successful provided we understand its basic principles and follow a strict protocol.

Today, single-component adhesives have gained popularity among clinicians due to the fact that they are easier and faster products that save valuable operator time. By the same token, the reduced number of application steps can help make their clinical performance more predictable as various extraneous variables are eliminated. We don't have to worry about mixing primer A and B and getting their proportions right. We only have one well in which to dip our applicator while operating (no chances of mistaking the primer for the adhesive). In addition, we need not worry about running out of one of



Figure 1: The 3M Single Bond Dental Adhesive System is a single component adhesive available in a translucent orange color vial that allows visual monitoring of the volume while protecting the photoinitiator from blue light.

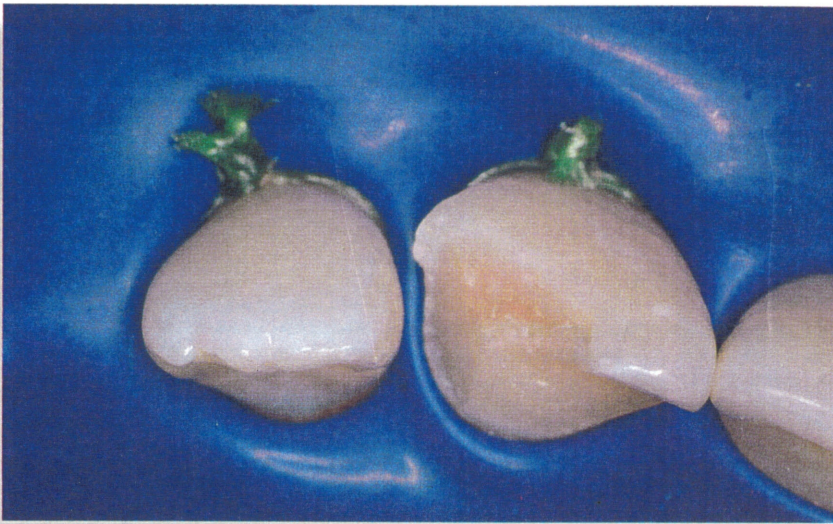


Figure 2: Achieving reliable adhesion to dentinal surfaces—a mystery all of us have to solve on a daily basis.



Figure 3: The 3M Single Bond vial presents a "pinch 'n flip" type of cap that aids in minimizing material waste and is very practical for dispensing the adhesive.

the components and having to buy a refill package.

A product that has been recently introduced which is easy to use, has a promising clinical performance, and casts confusion away is Single Bond Dental Adhesive System by 3M (Figure 2). Its chemistry is a solution of water, ethanol, HEMA, BisGMA, dimethacrylates, a novel photoinitiator system and a methacrylate functional copolymer of polyacrylic and polyitaconic acids. Presenting basically the same chemical components as its progenitor, Scotchbond Multi-Purpose, which has a positive track record, Single Bond is bound to have a promising career ahead. Having ethanol as the hydrophilic component makes Single Bond not as technique sensitive as acetone-based adhesives. This is because when premature volatilization of acetone occurs, an increase in the viscosity of the resin monomer ensues and the demineralized dentin is less likely to be fully permeated. Whereas alcohol is not as volatile as acetone, it still can be evaporated much more readily from the dentinal surface than the water contained in water-based adhesives.

Certainly, one of the most interesting features of this product is its contemporary vial. It has a "pinch & flip" cap design that can be opened with one hand and that minimizes adhesive waste associated with typical threaded caps.(Figure 3) For those of us who are concerned with inventory control, the translucent orange color vial enables us to visually review the volume of adhesive in a glance. The orange vial transmits light above the range of 350–520 nanometer wavelength thus protecting the photoinitiator from blue light.

Single Bond is to be applied on moist, blotted dentin (Figure 4). Two consecutive coats of adhesive are applied and air dried for 2-5 seconds,

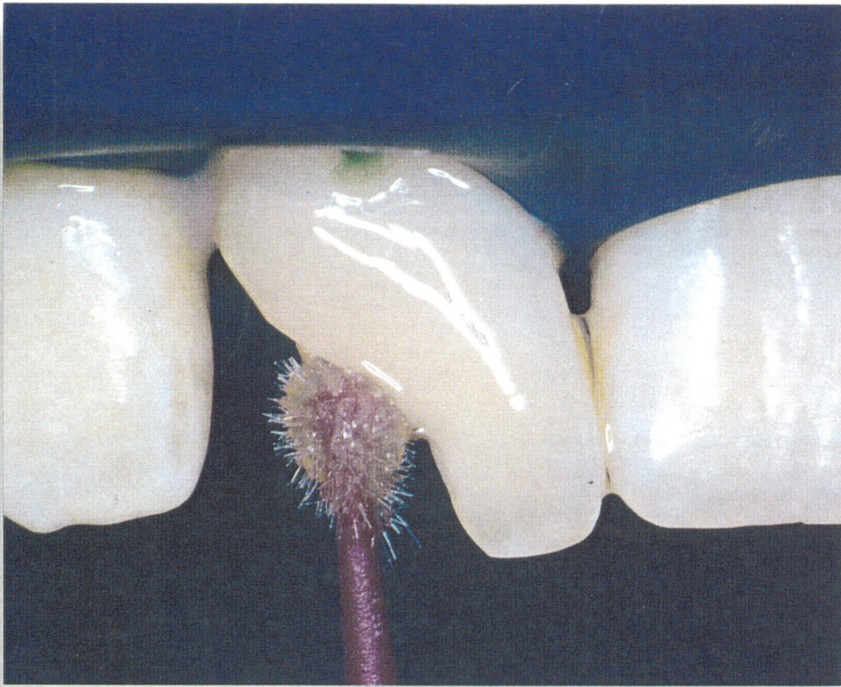


Figure 4: Two consecutive coats of Single Bond should be applied on moist dentin and air dried for 2-5 seconds.

after which the adhesive is light cured for 10 seconds. SEM reports have shown a film thickness of approximately 10 microns after application. That shiny dentinal surface, which tells us that we are heading for clinical success, can be readily perceived after the application of Single Bond. This light-cured adhesive system is indicated primarily for direct restorations, desensitization, and laminate veneers. 3M recommends the utilization of Scotchbond Multi-Purpose Plus for all other indirect restorative procedures.

When the trend is "the simpler the better", it is important to be able to associate simplicity with efficacy. Single-bottle adhesive systems seem to be earning a high position on the podium of adhesive dentistry. Single Bond just seems to be a promising winner. *AG*

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