Futurabond U - Desensitizing

VOCO GmbH, Knowledge Communication Department

Anton-Flettner-Str. 1-3
D-27472 Cuxhaven, Germany

Tel.: +49 (0)4721-719-0
Fax: +49 (0)4721-719-109

info@voco.de
www.voco.de

The latest generation of dental adhesives can be used universally. On the one hand, this frees the dentist to decide whether to additionally etch the dental hard tissue or not. On the other hand, their universal nature means these adhesives are compatible with all materials used in dentistry. In addition to composites, these include metals and various types of ceramics. The great strides made in developing materials have also extended the indication spectrum of the latest dental adhesives. This now enables the dentist to treat hypersensitive tooth necks as well as to seal cavities or glass ionomer cement restorations. Universal adhesives therefore also have a desensitizing effect. Prof. Torres from the University of São José dos Campos, São Paulo has investigated to what extent Futurabond U, the universal adhesive from VOCO, is suitable for use as a desensitizer with and without additional etching [1].

Desensitizing can be carried out by the application of fluoride-containing desensitizers and the associated blocking of exposed dentinal tubules by the precipitation of fluoride salts of low solubility. Mechanical sealing by the application of a thick layer is a second important desensitizing mechanism. Whereas the VOCO fluoride preparations such as Bifluorid 12 or Profluorid Varnish are based on the first mechanism, VOCO offers in the shape of Admira Protect a desensitizer whose effect and sealing are based on covering the exposed dentinal tubules. Universal adhesives are also based on a comparable desensitizing mechanism. The study conducted by Prof. Torres examined the effectiveness of the two universal adhesives Futurabond U (VOCO) and Scotchbond Universal (3M ESPE) and the specially developed desensitizer Admira Protect (VOCO). The effect of additional etching on desensitizing was also examined.
One measurable factor governing the effectiveness of a desensitizer is the permeability of the layer applied. The more impermeable the layer, the more effective is the relief of sensitivity for the patient. In order to measure permeability, excess pressure is applied over a defined period of time and the flow rate through the corresponding layer is then measured from which permeability can subsequently be calculated.

Study design

Dentine discs 1 mm thick, prepared from the buccal wall of extracted bovine incisors, were used for this *in-vitro* study. Grinding was carried out using silicone carbide paper in order to ensure the standardized uniform thickness of all dentine bodies, which is important for measuring permeability. 6 % citric acid was used to open the dentinal tubules on the side of the pulp. The buccal tubules were opened by immersing the dentine bodies in water for 30 minutes. Finally, the test specimens were stored for a further 10 minutes in an ultrasonic bath in 70 % ethanol. Permeability was measured at a pressure of 10 psi (~ 0.7 bar) for 2 minutes, with the maximum permeability for each test specimen initially determined as a reference, i.e. permeability was determined without the previous use of a desensitizer. The test specimens were then divided into five groups and different versions of desensitizing were applied which are set out in Table 1. The test specimens on which the tried and tested desensitizer, Admira Protect, was applied served as a control each time.

Table 1: Overview of the materials and modes used

Material/ mode	Application
Admira Protect (Control group)	- Apply and allow to act for 20 s, dry for 5 s, light cure for 10 s - Repeat procedure a second time
Futurabond U (Self-etch mode)	- Apply and rub in for 20 s, dry for 5 s, light cure for 10 s
Futurabond U (Total-etch mode)	- Etch with 35 % phosphoric acid for 15 s, then rinse for 20 s, soak up excess water with paper; - Apply Futurabond U and rub in for 20 s, dry for 5 s, light cure for 10 s
Scotchbond Universal (Self-etch mode)	- Apply and rub in for 20 s, dry for 5 s, light cure for 10 s
Scotchbond Universal (Total-etch mode)	- Etch with 35 % phosphoric acid for 15 s, then rinse for 20 s, soak up excess water with paper; - Apply Scotchbond Universal and rub in for 20 s, dry for 5 s, light cure for 10 s

Results

The results of the study conducted by Torres are set out in Fig. 1 below.

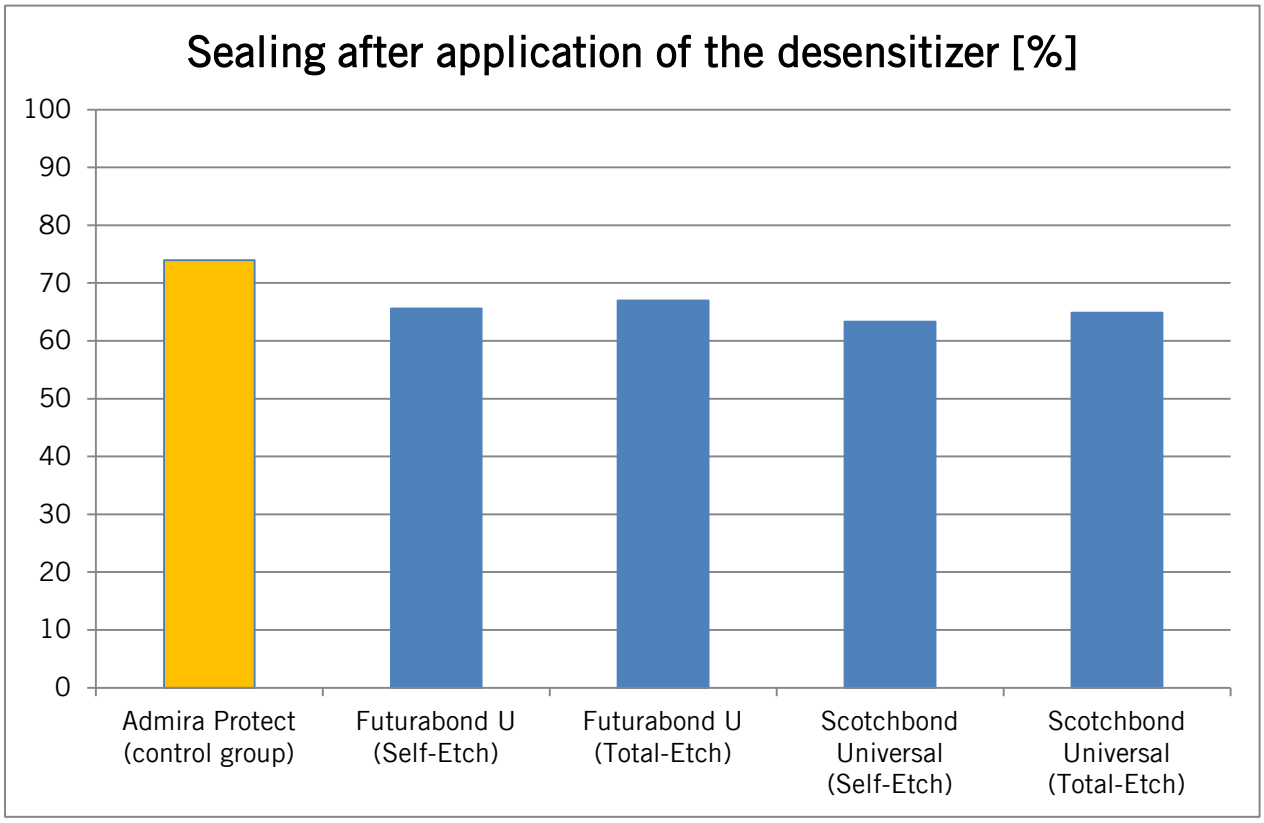

Fig.1: Sealing of the dentinal tubules after application of the different desensitizers

Admira Protect is a well-known, tried and tested desensitizer that has been found to be safe and reliable. The results in the above chart clearly show that the universal bondings enable dentinal tubules to be sealed to a standard comparable with that obtainable with conventional desensitizers. After application the layer of the desensitizer has a permeability of only 25 % and the bonding layers an average permeability of slightly over 30 %. The results show that both the conventional desensitizer and the universal bondings seal the dentine by about 70 to 75 %.

Admira Protect has a slightly better desensitizing effect because the material is applied twice. This of course makes it more likely that the dentinal tubules will be slightly more tightly sealed than after the application of a single layer because two layers are applied to the exposed tubules.

A further difference lies in the constituents of the materials. Whereas Futurabond U and Scotchbond Universal are based on an ethanol/water mixture, Admira Protect contains acetone as a solvent. The significantly different properties of these solvents manifest themselves for example in the flow and wetting behaviour of the material, an effect which was also confirmed by the slightly different values in the study conducted by Torres.

A further important point to emerge from the study was the fact that whether or not the dentine is treated with an acid-etch agent before the application of the universal bondings makes no qualitative difference. Clearly, the penetration depth of the dentinal tubules in the case of both Futurabond U and Scotchbond Universal does not depend on creating an etch pattern beforehand. This result confirms the benefits of the innovative step taken by the manufacturers in giving the dentist treating the dental hard tissue the choice of etching or not etching before applying the universal bonding. On the one hand, the dentist would save time by dispensing with etching and, on the other hand, they would eliminate the risk of causing the patient extreme discomfort by etching the exposed dentine.

Conclusion: Futurabond U can be used as a safe and reliable desensitizer on exposed tooth necks, delivering results comparable with the specially designed desensitizer Admira Protect. Futurabond U has thus once again demonstrated to practitioners that it really is one bond for all cases!

[1] Torres CRG, *Effects of universal adhesive systems using self-etch or total-etch mode on dentin permeability*, Report to VOCO, Universidade Estadual Paulista Júlio de Mesquita Filho, São José dos Campos, São Paulo, 2013.