



Title	Solvation of dried dentin matrix by water and other polar solvents
Author(s)	Pashley, DH; Carvalho, RM; Tay, FR; Agee, KA; Lee, WK
Citation	79th General Session and Exhibition of the International Association for Dental Research, Chiba, Japan, 27-30 June 2001, v. 80 n. Sp Iss
Issued Date	2001
URL	http://hdl.handle.net/10722/53905
Rights	Creative Commons: Attribution 3.0 Hong Kong License

Content-type: text/html

Mail form to: IADR, 1619 Duke Street, Alexandria, VA 22314-3406, USA

(FAX SUBMISSIONS WILL BE REFUSED.)

Type perfect original of abstract here:

Solvation of Dried Dentin Matrix by Water and Other Polar Solvents. D.H. PASHLEY¹, R.M. CARVALHO², F.R. TAY³, K.A. AGEE¹, W-K LEE* (Medical College of GA¹, Bauru Dent Sch², Univ of Hong Kong³, Chonbuk Nat Univ⁴).

The aim of this work was to evaluate the interactions of solvents used in adhesive dentistry with the dentin matrix. This study measured the pressure developed by solvents when they were added to dried, demineralized dentin matrix. Using extracted human teeth, mid-coronal dentin was used to prepare 2x2x1 mm specimens that were demineralized in 0.5M EDTA (pH 7) for 7 days (25°C). After drying at 0% RH, each specimen was held between a fixed steel plate and a sensing plate connected to a 5000 g load cell. Addition of water produced a swelling force of up to 500 g/mm² over 30 min. This same specimen was then redried and exposed to the following solvents in a repeated measures design: methanol (M), ethanol (E), propanol (P), butanol (B), N,N-dimethylformamide (N), acetone (A), hydroxyethylmethacrylate (H), formamide (F), ethylene glycol (EG) or water. The results were analyzed by one-way ANOVA and Tukey's test at $\alpha=0.05$. The resulting solvation pressures (g/mm²) were ($\bar{x} \pm SD$, N=8):

Solvents	M	E	P	B	N	A	H	F	EG	Water
\bar{x}	309	13	4	0	2	3	4	72	132	445
SD	114	4	2	3	3	3	2	15	33	126

Regression analysis showed that solvation pressure was inversely correlated ($R^2=0.86$) with the cube root of the molecular weight of the solvents and positively correlated ($R^2=0.79$) with the Hansen's solubility parameters for hydrogen bonding. Conventional bonding solvents (ethanol, acetone, HEMA) did not solvate the matrix. Supported, in part, by grant DE06427.

5. Area of Review (check only one):

(1) Behavioral Sciences/Health Services Research

10. List five descriptors by number (see reverse side).

If existing descriptors do not fit your research, then

1833

7022

[Browse the technical program](#)

of the 79th General Session of the International Association for Dental Research (June 27-30, 2001)