Table 1 – Experimental conditions employed in particle synthesis. Mean values of yield and particle size and DRX characterization finds.

					Light scattering (μm)		DRX	
#	pH	[c]	add	Yield %	D(0.5)	Span	Phase	morphology
1	-	-	-	89.4±2.4	30.5±10.2	1.71±0.02	DCPD	petal
2	+	-	-	97.3±0.9	18.0±2.0	1.57±0.13	DCPD	mixture
3	-	+	-	94.5±0.5	17.7±0.6	1.76±0.10	DCPD	mixture
4	+	+	-	96.1±0.4	12.7±3.4	1.68±0.01	DCPD	plate
5	-	-	+	91.3±0.6	16.4±0.5	1.44±0.18	DCPD	petal
6	+	-	+	96.6±1.3	17.0±2.0	1.45±0.05	DCPD	mixture
7	-	+	+	94.3±0.5	12.9±0.5	1.70±0.10	DCPD	mixture
8	+	+	+	96.7±0.5	11.1±1.6	1.44±0.05	DCPD	plate

(-) levels: pH = 5, [c] = 0.25 M, add= 10 mL/min. (+) levels: pH = drift, [c] = 1.25 M, add= 30 mL/min.

experimental resin composite studies. (FAPESP 2019/04737-4 and 2020/13983-6).

https://doi.org/10.1016/j.dental.2021.12.100

71

Biomimetic Approach to Evaluate Mineralization of BAG-Containing Resin Composite

J. Yun [1], K.-H. Tsui [1], Z. Fan [2], M.F. Burrow [1], J.P. Matinlinna [1], Y. Wang [3], A. Fok [4], J.K.H. Tsoi [1,*]

[1] *University of Hong Kong, Hong Kong*
[2] *Hong Kong University of Science and Technology, Hong Kong*
[3] *Sun Yat-Sen University, China*
[4] *University of Minnesota, USA*
[*] *Corresponding author.*

Purpose/Aim: This study aims at explores immersion solutions other than standard SBF that could evaluate mineralization of dental resin composites containing low percentage bioactive glass (BAG).

Materials and Methods: Experimental UDMA/TEGDMA resin composites containing total 25 vol% glass fillers (with 0.0, 1.9, 3.8 or 7.7 vol% of 45S5 bioactive glass (BAG) fillers) were prepared. The specimens were immersed in three different solutions either with bicarbonate which are Hanks balanced salt solution (HBSS) and cell culture medium (MEM), or without bicarbonate which is a novel Simple HEPES-containing Artificial Remineralization Promotion (SHARP) solution, for 3, 7 and 14 days. These solutions were then analyzed by ICP-OES and pH, and the surfaces of the BAG composites were analyzed by SEM, XRD and FTIR.

Results: ICP-OES revealed Ca and P concentration continuously decrease, while Si concentration increases with time in all groups. Only SHARP solution is able to maintain a constant pH over the immersion time. SEM, together with XRD and FTIR, showed nano-sized octacalcium phosphate (OCP) nanospheres formation on 3.8 and 7.7 vol% BAG composites after 14 days immersion in HBSS (500-600 nm) and MEM (300-400 nm). SHARP solution enabled OCP formation after 3 days and then self-assembled into urchin-like carbonated hydroxyapatite (CHA) microspheres encompassed with nanorods of 100 nm width and 8 m length after 14 days of immersion for 7.7 vol% BAG composites.

Conclusions: This study suggests the SHARP solution can evaluate mineralization biomimetically whereas CHA microspheres can be formed on BAG-containing resin composites.

https://doi.org/10.1016/j.dental.2021.12.101

72

Six-Year Bond Stability of Universal Adhesives with Alternative Dentin Treatments

R.V. Rodrigues [*], T. Al-Mosuli, R.M. Carvalho, A.P. Manso

Faculty of Dentistry, University of British Columbia, Vancouver, Canada
[*] *Corresponding author.*

Purpose/Aim: Evaluate the effects of four dentin treatments on microtensile bond strength (MBS) for two universal adhesives, ScotchBond Universal (SBU) and All-Bond Universal (ABU), after 24-hour, 1-year and 6-year water storage.

Materials and Methods: Flat dentin surfaces from human molars were treated as follows: (i) phosphoric acid 35% (PA) for 15 s; (ii) PA for 5 s; (iii) 17% EDTA for 60 s; (iv) no treatment (self-etch mode). One of the two universal adhesives was then applied to the surface. After 24-hour storage at 37 C, teeth were sectioned to obtain beams (~0.9mm2) and randomly assigned to one of the storage times (24 h, 1-y and 6-y). Specimens were tested until failure at 1.0 mm/min on each incubation period. Failure modes were assessed with light microscope at 40x (Olympus, Tokyo, Japan). Data was submitted to Three-Way ANOVA and all pairwise multiple comparison (Holm-Sidak) at significance level = 0.05.

Results: Statistical differences were detected for surface treatments and storage times. A significant interaction between adhesive and treatment was found ($p<0.01$). The bond strengths were affected by the different surface treatments, depending on the adhesive, except for 17% EDTA with similar results for both systems. After 6-year storage, SBU showed more stable MTBS with 17% EDTA 32.36 (14.09) and self-etch mode 30.10 (13.80) ($p<0.05$). For ABU, the lowest MTBS was observed with the self-etch mode for all storage times ($p<0.01$). However, 17% EDTA