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## Development and testing of novel bisphenol A-free adhesives for lingual fixed retainer bonding

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**Aim:** To comparatively evaluate the properties of two BPA-free experimental adhesives (EXA, EXB) for lingual fixed retainer bonding versus a commercially available reference material (Transbond LR-TLR) based on BPA-compound.

**Materials and Methods:** The experimental materials were a flowable 60 percent glass filler-filled UEDMA/TEGDMA flowable composite (EXB) and a 70 percent glass filler-filled paste composite with PCDMA/UEDMA/TEGDMA co-monomers. The properties tested were degree of conversion (DC %), mechanical properties (Martens hardness-MH, elastic modulus- $E_{IT}$ , elastic index- $n_{IT}$ ), effect of prolonged (6 months) water storage (changes in Vickers microhardness-VHN) and pull-out strength employing a multi-stranded wire.

**Results:** EXB showed the highest DC% (63.6%), followed by EXA (50.5%) and TRL (44.1%) with all means differences being statistically significant ( $P < 0.05$ ). The statistical rankings of MH (MPa) and EIT (GPa) means were TLR (76.1MPa; 17.3GPa) > EXA (53 MPa; 12.9 GPa) > EXB (12.9 MPa; 6.7 GPa), whereas for  $n_{IT}$ , EXB (40%) > EXA (34.9%), TLR (33.6%). All materials were affected by prolonged water storage with significant differences among them in VHN. TLR was the most affected material ( $\Delta VHN = -11\%$ ), followed by EXA ( $\Delta VHN = -6.8\%$ ) and EXB ( $\Delta VHN = -4.2\%$ ). No statistically significant differences were found in the pull-out strength testing (24-24.2 N range) and failure mode (70-77% mixed).

**Conclusion:** Considering the differences between the two experimental materials, it may be concluded that the material containing the PCDMA/UEDMA/TEGDMA co-monomers may be used as an alternative to the control.

### Biography

Theodore Eliades has graduated from the School of Dentistry, University of Athens, Greece and completed the Orthodontic Postgraduate program of the Ohio State University earning a Master as well as a Doctorate from the University of Athens, School of Medicine and a PhD from the University of Manchester, UK. He has also obtained certificates in human resources management, leadership management, cultural integration management and management. His research has generated over 170 papers and 35 book chapters, which have received 4700 citations (H index 38). He has edited 9 textbooks published by major houses. He is currently the Editor-In-Chief of the *J Dent Biomec*, Associate Editor of the *Eur J Orthod*, the *Am J Orthod Dentofacial Orthop* and *Progress Orthod*, Editorial Board member in 6 and Reviewer in 40 periodicals. He has served as a Member of the task force for harmonization of worldwide postgraduate orthodontic education of the World Federation of Orthodontists and the revised Erasmus guidelines committee for postgraduate orthodontic education in Europe.

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