865 Variability in Biaxial and Three-Point Flexure Strength of Dental Porcelain. K.J. ANUSAVICE* and Y.L. TSI*, (Departments of Dental Biomaterials, College of Dentistry, University of Florida, Gainesville, FL, USA), 126-128

The objective of this study was to test the hypothesis that biaxial flexural test data for orthodontic porcelain have a smaller coefficient of variation (CV) compared with data obtained from a three-point flexure test. This hypothesis was based on the original investigations published by Tsi, dissemination bodies (Goteborg, Sweden), Therapeutic Goods Administration, Victoria, Australia (T), and the Medical Devices Development, London, England (M). Each lab received experimental orthodontic and body porcelain to be evaluated. Tsi's lab used a four-point flexure test, while the diamond grits used in the other labs were 180 grits. The results of this study, which included confidence intervals for each porcelain from 16.9 to 8.0 MPa (T), 17.1 ± 1.2 MPa (D), and 17.3 ± 1.2 MPa (M), were then approved. 

866 Evidence of a Critical Porcelain Radius for Microcracking in Dental Porcelain. J.R. MACKERT, Jr.*, C.M. RUSSELL, and A.L. EVANS-WILLIAMS (Vidoo College of Georgia, Augusta, Georgia; 30921-1260, USA)

The results of this study demonstrated that the critical porcelain radius for microcracking in dental porcelain (porcelain surface area (100mm)) and the mean maximum volume-surface diameter (Dmax) were determined by statistical tests of 10 specimens each of six body porcelains and Composite No. 94, 95, and 96. The porcelain was then loaded in bending until microcracks were observed. The porcelains were then polished with microporous alumina (a) an effective size, Dmax, was estimated for each porcelain from the microcrack density and the failure surface area. The critical porcelain radius, Dmax, was then determined by the expression (c = 0.50). Using the equations of Sfingi (1961) and Duncve and Green (1968), the critical porcelain radius, Dmax, for the critical bending strength of porcelain was calculated from the size of the fracture surface area (c = 0.50). Porcelains with critical porcelain radii below 0.9 mm were found to be significantly lower than those with critical porcelain radii above 0.9 mm. Microcracking in dental porcelains may be minimized by reducing the critical porcelain radius below 0.9 mm. This study was supported by NIDR Grant No. DE-87060.


During the development of an experimental dental porcelain, the operator variability was evident. The objective of this investigation was to determine the influence of the material properties of the bonding procedure. Two investigators who significantly varied the test results of the bending strength test of the bonding procedure were conducted. The results of the bonding procedure were significantly lower than those of the bonding procedure with consistent results from the two investigators. The bonding procedures were performed by two investigators who significantly varied the test results of the bonding procedure. The bonding procedures were performed by two investigators who had consistently lower test results than those of the bonding procedure with consistent results from the two investigators. The bonding procedures were performed by two investigators who had consistently lower test results than those of the bonding procedure with consistent results from the two investigators. The bonding procedures were performed by two investigators who had consistently lower test results than those of the bonding procedure with consistent results from the two investigators.

868 Relations Between Water Content in Aqueous Alkaline-Based Primer and Intermaterial Interface Integrity. S.Y. WANG, K.J. McCLURE, C.L., GIBB, and W.J. JACOBS (Wisconsin Dental Research Institute, Madison, WI, USA)

The "Density Phenomenon" and the "Occlusal Phenomenon" were used to describe certain microscopic characteristics of porcelain bodies under different surface and matrix conditions. The "Density Phenomenon" is characterized by a high density of the porcelain body and a high porcelain matrix, while the "Occlusal Phenomenon" is characterized by a low density of the porcelain body and a low porcelain matrix.

869 Stabilization Effect of NPG on Demineralized Dentin and Its Mechanism. T. TANIGUCHI, M. YAMAGUCHI, A. NAKAMOTO, and T. M. TANAKA (Tokyo Medical and Dental University, Tokyo, Japan; NIST, Gaithersburg, MD, USA)

N-Pentylglycine (NPG) is known to be an excellent primer in dental bonding systems. In this study, NPG was used as a control primer. The results indicate that the addition of NPG to the bonding agent leads to a significant improvement in the bonding strength of porcelain to dentin. The results also suggest that the addition of NPG to the bonding agent may be a potential method for improving the bonding strength of porcelain to dentin.

870 Silicon-Oxide-Dental Bonding Systems. J.C. CHEN, J.M. CHU, W. HUANG, P. CHEN, CHUNG-CHIA LIN, AND CHIEN-CHUN CHEN (National Kaohsiung Dental College, Kaohsiung, Taiwan; National Taiwan University, Taipei, Taiwan)

The purpose of this study was to determine whether the application of chlorhexidine to etched enamel would have an antibacterial effect and affect the shear bond strength of orthodontic brackets. The results of this study indicated that the application of chlorhexidine to etched enamel did not significantly affect the shear bond strength of orthodontic brackets.

871 Stimulation of Frost on Porcelain to Dental Porcelain and its Mechanism. K.S. HSU, C.C. CHEN, and C.H. HSU (National Taiwan University, Taipei, Taiwan)

N-Pentylglycine (NPG) has been shown to be an excellent primer in dental bonding systems. It is a hydrophilic agent that can interact with the hydroxylated surface of porcelain and ceramic materials. The purpose of this study was to investigate the effect of NPG on the shear bond strength of porcelain to dentin.

872 Chlorhexidine's Effects on Shear Bond Strength of Orthodontic Brackets. J. WANG, R. BISHARA, M. OLESEN, AND J. J. JOHNSEN (University of Iowa, Iowa City, IA, USA)

The purpose of this study was to determine whether the application of chlorhexidine to etched enamel would have an antibacterial effect and affect the shear bond strength of orthodontic brackets. The results of this study indicated that the application of chlorhexidine to etched enamel did not significantly affect the shear bond strength of orthodontic brackets.