

Press Release

IPS e.max® Lithium Disilicate Material Proven to Be more Durable than Veneered Zirconium Oxide Crowns

Schaan, August 7, 2009 – **Mouth motion-simulator at New York University College of Dentistry used in step-stress fatigue testing**

Researchers in the Department of Biomaterials and Biomimetics at New York University College of Dentistry (NYU) recently determined through mechanical mouth-motion simulator testing that crowns made of IPS e.max CAD lithium disilicate ceramic are more robust than veneered zirconium oxide crowns*. The study results were first presented earlier this year at the 39th Annual Session of the American Academy of Fixed Prosthodontics by P.C. Guess, R. Zavanelli, N. Silva, and V.P. Thompson.

The NYU researchers used the mouth-motion-simulator test to compare the durability of IPS e.max CAD lithium disilicate full-coverage crowns to veneered zirconia crowns. By replicating actual forces exerted in the human mouth, this test provided a more realistic assessment of how ceramic materials hold up to the forces of chewing. In particular, unlike previous laboratory tests that only assess a material's physical properties to meet minimal standards, the mechanical mouth simulator stressed the restorations using clinically relevant directed loads over thousands of cycles (similar to how people chew) until failure occurred. Failure was considered to be chip-off fractures of the veneering ceramic in the case of the zirconia crowns or fracture/chip through the lithium disilicate crowns.

The research found that none of the IPS e.max CAD lithium disilicate crowns failed below 1,000 N and 1 million cycles. In comparison, the veneered zirconia crowns tested

demonstrated limited reliability, with approximately 50% of the crowns tested failing from veneer chip-off fractures by 100 K cycles at 200 N, which is similar to previous research findings. Also, 90% of the veneered zirconia crowns tested failed by 100 K cycles at 350 N.

Overall, in comparison to the veneered zirconia systems that were tested, the IPS e.max CAD lithium disilicate full-coverage crowns can be expected to demonstrate excellent clinical performance relative to chipping or fracture based on the findings of the NYU College of Dentistry mouth motion simulator testing. The failures reported in this study mimic those reported in clinical studies, suggesting that monolithic IPS e.max lithium disilicate crowns are the most robust all-ceramic crowns tested to date.

***Mouth Motion Fatigue and Durability Study**

Petra C Guess, Ricardo Zavanelli, Nelson Silva and Van P Thompson, NYU, March 2009.

Caption:

(Lithium disilicate_Zirconium oxide.jpg)

Monolithic lithium disilicate restoration (left) and veneered zirconium oxide crown (right).

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