

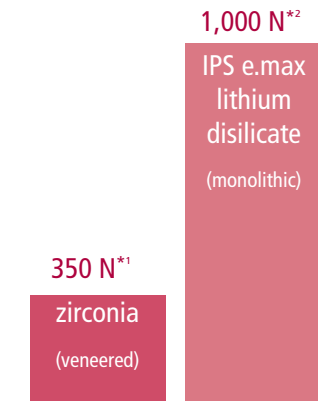
# IPS e.max Lithium Disilicate Durability

## Mouth Motion Fatigue and Durability Study

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

### Synopsis:

IPS e.max CAD lithium disilicate was more robust than veneered zirconia in mouth motion fatigue and did not show failure up to 1000 N loads with one million cycles.



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<sup>1</sup> 90% failure by 100,000 cycles

<sup>2</sup> No failures at 1 million cycles

### Executive Summary:

- Porcelain veneered zirconia crowns and monolithic lithium disilicate crowns were tested
- Mouth-motion-step-stress-fatigue was used to examine reliability and failure modes
- Failure was considered to be chip-off fractures of veneering ceramic or fracture through the crown
- Three step-stress profiles were used up to failure or up to 900 N and 180k cycles after which a staircase fatigue method was implemented to a load at which 50% of specimens could be expected to survive 1 million cycles
- Veneered zirconia crowns resulted in limited reliability - approximately 90% of specimens would fail from veneer chip-off fracture by 100k cycles at 350 N. These results are similar to previous findings for other veneered zirconia systems (LAVA, Cercon/Vita) tested using this methodology (Coelho PG, Silva NR, Bonfante EA, Guess PC, Rekow ED, Thompson VP. Fatigue testing of two porcelain-zirconia all-ceramic crown systems. Dent Mater. 2009 Apr 21. [Epub ahead of print] (50% failure at 200 N for 50k cycles for both veneered zirconia systems.)
- Approximately 90% veneered zirconia specimens failed by 350 N independent of the number of cycles
- The e.max CAD lithium disilicate specimens survived ratio fatigue of 1 million cycles at loads of 1000 N. There appears to be a threshold for damage/fracture for the lithium disilicate in the range of 1100-1200 N.