

## POSTER

### **Comparison of fracture load of monolithic and veneered zirconia posterior fixed dental prostheses under static and cyclic loading.**

Area: Fixed Prosthesis

University/Department:

University Complutense of Madrid/Departament of Buccofacial Prosthesis

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Objective:

The purpose of this in vitro study was to evaluate the influence of static and cyclic loading on the fracture load of monolithic and veneered zirconia CAD/CAM posterior fixed dental prostheses. The null hypothesis was, that no differences in load to fracture between static and cyclic loading would be found among the zirconia systems.

Materials:

One hundred standardized specimens with 2 abutments and screwed on a platform were prepared from stainless-steel to receive posterior 3-unit FDPs with an intermediate pontic. The specimens were randomly divided into 5 groups (n=20 each): (1) (MC) metal-ceramic (control group), (2) (LZ) Lava Zirconia system (3M ESPE), (3) (LP) Lava Plus (3M ESPE), (4) (YZ) VITA In-Ceram YZ (Vita Zahnfabrik) and (5) (ZZ) IPS e-max ZirCAD (Ivoclar Vivadent). Half of specimens of each group (n=10) were subjected to static load and the other half were subjected to thermal and mechanical cycling at 5 degrees and 55 degrees with a 30-second dwell time for 120.000 cycles in a masticatory simulator (Chewing Simulator CS-4.2 economy line; SD Mechatronik GMBH). All FDPs were subjected to a three-point bending test until fracture using a universal testing machine at a crosshead speed of 1 mm/min. Fracture load of veneering ceramic and total fracture was recorded for each specimen. Data were statistically analysed using two-way ANOVA, Tukey HSD post hoc test and Student t test.

Results:

When comparing the veneering ceramic load, significant differences were recorded between metal-ceramic and zirconia groups ( $P=.0001$ ), but no differences were observed between static and cyclic loading ( $P=.273$ ). Differences among groups were observed for total fracture load regarding material ( $P=.0001$ ) being the differences between metal-ceramic and Lava Plus group and the other groups. Significant differences were also found on total fracture for the type of loading ( $P=.0024$ ). Cyclic loading significantly decreased the fracture load of Lava Plus group ( $P=.005$ ).

Conclusion:

Lava Plus showed the highest fracture load values independently of the type of loading. Cyclic loading did not affect the fracture load of veneering ceramic or total fracture of veneered zirconia groups, but decreased the fracture load of monolithic zirconia.