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ACCEPTED MANUSCRIPT

**Mechanical performance of Y-TZP monolithic ceramic after grinding and aging: survival estimates and fatigue strength**

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## **Abstract**

This study aims to evaluate the flexural fatigue strength and survival estimates of an Y-TZP monolithic ceramic after grinding and aging. Ceramic discs (1.2 mm thickness × 15.0 mm diameter - ISO: 6872-2015) of zirconia (Zirlux FC2 – Ardent; Ivoclar Vivadent) were made and randomly allocated into 6 groups (n=10), according to grinding and aging factors: Ctrl – as-sintered; Ctrl Sto – as-sintered and dry stored at room temperature for 2 years; Ctrl Aut Sto – as-sintered, submitted to autoclaved aging (134°C, 2 bar, 20 hours) and then dry stored for 2 years; and similar conditions for ground samples (Ground; Ground Sto; Ground Aut Sto). Grinding was performed with diamond burs (#3101G, KG Sorensen) coupled to a contra-angle torque multiplier attached to a low speed motor under constant irrigation. Fatigue testing followed a step-stress approach. Data from strength and number of cycles until fracture were recorded and analyzed through Kaplan-Meier and Mantel-Cox tests. Both grinding and aging increase monoclinic phase content. The topography was altered by grinding but not by aging procedures. Grinding did not alter the fatigue strength (Ctrl = Ground), while aging increase it only for ground groups (Ground Sto, Ground Aut Sto). Aged conditions (Ctrl Sto; Ground Sto; Ctrl Aut Sto; Ground Aut Sto) showed increased survival probabilities for

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