

## Author's Accepted Manuscript

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PII: S1751-6161(17)30253-9  
DOI: <http://dx.doi.org/10.1016/j.jmbbm.2017.06.016>  
Reference: JMBBM2376

To appear in: *Journal of the Mechanical Behavior of Biomedical Materials*

Received date: 4 May 2017  
Revised date: 9 June 2017  
Accepted date: 12 June 2017

Cite this article as: Camila Pauleski Zucuni, Luís Felipe Guilardi, Marilia Pivetta Rippe, Gabriel Kalil Rocha Pereira and Luiz Felipe Valandro, Fatigue strength of yttria-stabilized zirconia polycrystals: Effects of grinding and post-processing treatments, *Journal of the Mechanical Behavior of Biomedical Materials* <http://dx.doi.org/10.1016/j.jmbbm.2017.06.016>

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ACCEPTED MANUSCRIPT

## Fatigue strength of yttria-stabilized zirconia polycrystals: Effects of grinding and post-processing treatments

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### ABSTRACT

This study aimed to evaluate and compare the effect of different surface post-processing treatments (polishing, heat treatment, glazing, polishing + heat treatment and polishing + glazing) on the superficial characteristics (micromorphology and roughness), phase transformation and fatigue strength of a Y-TZP ceramic ground with diamond bur. Discs of Y-TZP ceramic were manufactured (ISO:6872-2015; final dimensions of 15 mm in diameter and  $1.2 \pm 0.2$  mm in thickness) and randomly allocated according to the surface condition: *Ctrl* – as-sintered; *Gr* – ground with coarse diamond bur; *GR+HT* – ground and subjected to the heat treatment; *Gr+Pol* – ground and polished; *Gr+Pol+HT* – ground, polished and heat treated; *Gr+Gl* – ground and glazed; *Gr+Pol+Gl* – ground, polished and glazed. The following analyses were performed: roughness (n=25), surface topography (n=2), phase transformation (n=2) and fatigue strength by staircase method (n=20). All treatments influenced to some extent the surface characteristics of Y-TZP, being that polishing reduced the surface roughness, the m-phase content and improved the fatigue strength; glazing led to the lowest roughness values (Ra and Rz), although it showed the worst fatigue strength; heat treatment showed limited effect on surface roughness, led to complete reversion of the existing m-phase content to t-phase, without enhancing fatigue performance. Thus, a polishing protocol after clinic adjustment (grinding) of monolithic restorations based on

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