瓷修复体界面仿生功能梯度层的构建及力学性能分析

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【摘要】 **目的**　体外研究玻璃渗透技术形成的氧化锆梯度陶瓷在不同预烧结温度下试件弹性模量与抗压强度的变化。 **方法**　将功能梯度氧化锆试件按照预烧结温度分为 900℃、1000℃、1100℃ 3 组，电镜下观察梯度层的微观结构 , 并对试件作纳米压痕试验和最大断裂压力测试，检测氧化锆试件的弹性模量与抗压强度。**结果**　电镜显示氧化锆试件表面形成了约 150~200 μ m 的梯度结构层，氧化锆功能梯度层内弹性模量逐渐增高。预烧结温度 1000℃时试件抗压强度最高，与其他组有显著性差异（P<0.05）。 **结论**　利用玻璃渗透技术可以在氧化锆核瓷内形成弹性模量梯度结构，预烧结温度 1000℃时对试件的增韧效果显著。

【关键词】 全瓷　仿生功能梯度　预烧结　弹性模量　抗压强度

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Mechanical analysis and fabrication of the bioinspired functionally graded interface layer of all-ceramic restoration

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【**Abstract**】 **Objective**　To research the change of elastic modulus and compressive strength of glass infiltrated zirconia ceramic at different presintering temperature. **Methods**　The functionally graded zirconi a specimens were divided into three groups according to the presintering temperature 900℃ , 1000℃ and 1100℃ . Then the microstructure of the gradient layer structure of the zirconia specimens was observed. And the nano-indentation method and maximum fracture stress test were used to determine the elastic modulus and the compressive strength of zirconia specimens. **Results**　There was about 150-200 μ m functionally graded layer formed on the surface of zirconia specimens by the electron microscopy. In the functionally graded layer, the elastic modulus was increased gradually. When the presintering temperature was 1000 ℃ , the compressive strength is the highest, and there was significantly difference compared to other groups (P<0.05). **Conclusions**　The glass infiltration technology can form elastic modulus gradient structure on the surface of the zirconia core porcelain. The toughening effect on the zirconia ceramic specimen was improved by lower presintering temperature.

【**Key Words**】 All ceramic　Bioinspired functionally graded layer　Presintering　Elastic modulus　Compressive strength

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