牙科钴铬合金表面镀氮化锆层后的耐磨性研究

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【摘要】 **目的** 评价钴铬 (Co-Cr) 合金表面经镀氮化锆膜后的耐磨损性，为口腔临床要求的基底表面处理方式提供参考依据。**方法** 运用磁控溅射镀膜技术，设定基体加热温度 200℃恒定，分别在①功率为 100w、氮气分压选择为 25%、35%、45% 以及②氮气分压 35%，功率为 50w、100w、200w 的条件下，在 Co-Cr 合金表面沉积氮化锆涂层，采用磨损试验机测试并比较氮化锆涂层和未镀膜之间的耐磨性能。**结果** 镀氮化锆试件的失重量显著小于未镀膜试件 (P<0.05). 其中当镀膜的功率和基体温度恒定条件下，氮气分压在 35% 时镀膜后磨损的失重量最少．而当镀膜的氮气分压和基体温度恒定时，功率在 50W 时镀膜后磨损的失重量最少。**结论** 在合适的工艺条件下，用磁控溅射镀膜技术可以在牙科铸造支架 Co-Cr 合金表面制备耐磨性能更优的氮化锆薄膜。

【关键词】 氮化锆 磁控溅射镀膜技术 钴铬合金 耐磨性

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Study on wear resistance of zirconium nitride coating on dental Co-Cr alloy

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【**Abstract**】 **Objective** To provide a reference basics for the substrate surface treatment according to oral clinic requirements, the wear resistance of zirconium nitride coating on dental Co-Cr alloy was evaluated in this study. **Methods** Using the magnetron sputtering deposition technology, under a constant heating temperature (200 ℃), ① constant sputtering power (100 w) with different nitrogen partial pressure (25%, 35%, 45%), and ② constant nitrogen partial pressure (35%) with different supttering power (50w, 100w, 200w), the zirconium nitride coating was deposited on the surface of dental Co-Cr ally. The wear resistances of two dental Co-Cr alloys with and without zirconium nitride coating were assessed and compared by wear resistance tests. **Results** The weight loss of test specimens with zirconium nitride coating was significantly less than the uncoated specimens (P<0.05). Under deposition conditions of constant sputtering power and substrate temperature, the weight loss reached the minimum when the nitrogen partial pressure was 35%. Under deposition conditions of constant nitrogen partial pressure and substrate temperature, the weight loss of dental Co-Cr alloy with coatings reached the lowest value when the power was 50w. **Conclusion** Under the suitable technological conditions, zirconium nitride coatings with excellent properties can be prepared on dental casting Co-Cr alloy by magnetron sputtering coating technology.

【**Key words**】 Zirconium Nitride Magnetron Sputtering Coating Technology Dental Co-Cr Alloy Wear Resistance

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