Mechanical Properties of Co-Cr-Mo Alloy in Dependence in the Composition and Production

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The aim of this work was studying the effect of the composition and production on mechanical and tribological properties of cobalt alloys. Co-Cr-Mo alloy began to be used for manufacturing dental implants, but nowadays they are successfully used for the production of orthopaedic implants thanks to better wear resistance than is offered by titanium implants. However, there is still ongoing effort to even more improve the wear resistance and other properties of cobalt based alloy. The aim of this research was to find a suitable combination between composition and production, which would increase the wear resistance, keeping the other mechanical properties at least at the same level. Standard Co-Cr-Mo alloy and also Co-Cr-Mo alloy with various alloying elements, specifically Nb, Ti in an amount 5 wt%, were prepared by casting and also mechanical alloying followed by compacting method "Spark Plasma Sintering". The influence of production route as well as influence of alloying elements on the microstructure, mechanical and tribological properties were observed. Based on the obtained results, the Co-Cr-Mo-Ti alloy production by casting seems to be most suitable, because the addition of titanium has greatly improved the wear resistance. However, it is necessary to perform many other tests, especially tests of corrosion resistance and biocompatibility.

Keywords: cobalt alloy, mechanical properties, biomaterial, type of production, wear resistance

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