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PROSPECTS FOR THE USE OF PLASMA SPRAYING IN MEDICINE

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The aim of this paper is to analyze the experience in and the prospects for using plasma spraying in the solution of medicine-related problems.

The main lines in the medical use of plasma spraying are dental implant making and bone and joint prosthesis making.

The metal implant – bone tissue system is the most complex composite material formed in the human body. The paper analyzes the factors that must be considered for the successful making of implants intended for a long-term use in the patient's body. The main materials that are currently used in their making are titanium and its alloys (they are applied to the metal parts of prostheses to increase their wear resistance), hydroxyapatite (HA), and fluorite (they have a structure similar to the bone tissue, as a result of which the prostheses are not rejected and grow into the bone).

The paper presents practical results of the use of plasma spraying in prosthesis making and the features of implant surface formation. The aspects of porous structure "osteojunction" (the ability of the material to promote the growth of the bone tissue deep into and along the implant) and osteointroduction (an additional capability of the structure and the behavior of the newly formed bone tissue at the local level) are discussed. Ideas of the surface structure of implants best suited to their integration with the bone tissue are outlined.

The results of the diagnostic methods currently used in biomedical research to control the quality of prostheses made using plasma spraying are presented.

The general conclusion of the analysis of the achievements in the use of plasma spraying in prosthesis making is as follows: the density of filling of the porous layer on the implant surface with the newly formed bone tissue and the strength of that bone tissue determine the efficiency of implant-to-bone load transfer, the mechanical strength of the resulting composite material, and the implant durability. This statement is a result assessment criterion in the course of further improvement of plasma spraying for medical purposes.

Keywords: *plasma spraying, prosthesis making, dental implant making, material structure study, strength control methods, biocompatibility, biological tissue study methods.*

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