

# Selected problems of a biocompatibility of the pneumatically controlled arm

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**Abstract:** A prototype of a human arm aimed on simulation of a real human arm dynamics is presented. During the construction of the prototype several problems have been successfully solved: (i) the bone shapes and their durability are taken into account in the construction; (ii) muscles modelling, their force characteristics and displacements are included; (iii) constrains introduced by joints are taken into account. The main purpose of the artificial arm construction is to get possibility of simulation of all observed biological movements. The shape and complex mobility (activity) of a human arm creates many technical problems, which will be illustrated and discussed. In the prototype the following original novel construction elements have been proposed: the glen humeral joint, the elbow joint and the wrist joint with the possibility of an ulna and radius rotation. Special shapes of the radial bone and the ulna bone have been also proposed. In addition, pneumatic McKibben-type muscles have been constructed, and their control have been carried out. Finally, a comparison of range of motion of the prototype and the real world biological system is also presented using the so-called SFTR method.

**Keywords:** artificial arm, pneumatic muscles, SFTR

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