Alena Cepkova et al., J Spine Neurosurg 2018, Volume 7
DOI: 10.4172/2325-9701-C1-011

Smart joint as a heart of the training and body strenghtening equipment for trunk muscles for people with back pain

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This paper aims to describe the development and design of equipment for testing, training and strengthening trunk muscles. This lightweight modular mobile equipment is made of high-strength, light-weight materials. This training equipment is subject to patent application by the authors of this article. The basic load-bearing structure is a combination of supporting parts – plastic elements, and stress-bearing elements made of lightweight alloys based on aluminium, magnesium and titanium, as well as foam composites made of the above-mentioned materials. From the structural point of view, the most difficult task is to design and calculate the dimensions and strength parameters for the articulated joints of the particular components of the equipment. The specific requirement for the design is the ability to set all the functions, such as the direction, magnitude of angles and resistance strength, in both manual and remote control modes. The data obtained have to be evaluated and stored automatically. At the same time it should provide feedback diagnostics via data collection with the evaluation of each movement (graph+curves, a chronological record of momentum over a certain time), as well as the possibility to connect this equipment to other sensors. This article deals with the first stage of the development: the design and testing of the intelligent joint - the heart of the whole equipment.

Biography

Alena Cepkova has completed his PhD from Comenius University in Slovakia. She is the Director of Centre languages and Sport, Slovak University of Technology in Bratislava, Slovakia. She has published more than 30 papers in reputed journals and has been serving as an Editorial Board Member of the several conference.

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