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Medical robotics: the first steps of medical robots

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ABSTRACT

The world's onrush of robotics provides new possibilities in many areas including medicine. If we have analyzed publication's chronology on the Internet portals devoted to robots we would found the great leap in publications about medical robots during last 2-3 years. This brief review deals with new tendencies in medical device engineering – medical robots. The simple classification of medical robots and predictions of development of them is offered. The most interesting fields of application of robots in the Health Care Industry are shown. The definition of the medical robot in the beginning of the article is formulated. Due to that **medical robots are electromechanical devices which partially or completely carry out some functions of human (sometimes of animal) or theirs organs while solving medical problems**. Classification and examples of medical robots are given in the article as follows:

1. **The manipulator-doctor** (a surgeon, a therapist, etc.) - the automated electromechanical manipulators, capable to effect surgical operations, diagnostic inspection or therapeutic treatment under the direct control from outside by the human-doctor.
2. **The robot mannequin** - the robot-simulator of an anatomic structure, the functional organization and behavior of a man what is intended for training of medical staff.
3. **The rehabilitational robot** - the robot what is intended to do exercises with patients for the purpose of acceleration of a rehabilitation after various diseases.
4. **The robotized artificial limbs, including exoskeleton** - the intelligent electromechanical devices to backup of lost working capacity of limbs or organs of a patient.
5. **Helpmate robot** - the robots for low qualification work: to carry documents, to submit the necessary tool to the surgeon, to sort medicines, to interview the patient on a certain template, to take it temperature, etc.
6. **Medical micro- and nanorobots** - small sizes robots, capable to carry out various medical problems inside a body of a patient.

The offered classification is most friendly to the medical workers who do not have a special technical education. It allows a doctor to orientate in this problem and understand a future of

medical robots. Developed world goes on the way of intensive robotics developing not only in medicine, but also in our everyday life. Therefore it is important to understand existing tendencies and to be prepared to them.

As for our country, first of all, we expect a spate of the foreign robotized artificial limbs in the nearest future. The large educational and scientific medical centers, probably, will start to buy single robots-manipulators and robots-dummies. At the same time we don't expect an emergence of robots-assistants. They can appear only in the most successful clinics with special financing or in the conditions of strong lack of low-qualification medical staff. Application of nanorobots in medicine still only is an imagination and scientific research for the next 5-10 years.