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РОБОТОТЕХНИКА В МЕДИЦИНЕ

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Современный мир не стоит на месте, качество жизни людей улучшается с каждым днем, человечество достигает неслыханных высот во всех сферах жизнедеятельности, и медицина не является исключением. Применение роботехники в медицине имеет огромный потенциал для улучшения качества здравоохранения и повышения эффективности постановки точного диагноза, течения лечебного процесса и проведения различных операций. В данной статье рассмотрено применение робототехники и новейших технологий в медицине.

Ключевые слова: роботы, новые технологии, медицина, проблемы, преимущества, возможности, робототехника.

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ROBOTICS IN MEDICINE

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The modern world does not stand still, the quality of life is improving every day, humanity is reaching unheard-of heights in all spheres of life, and medicine is no exception. The use of robotics in medicine has a huge potential to improve the quality of healthcare and increase the efficiency of accurate diagnosis, the course of the treatment process and various operations. Every year, doctors are increasingly faced with a high workload, resulting in a growing demand for medical services. Robots in medicine facilitate the working activity of doctors [1].

Key words: robots, new technologies, medicine, challenges, benefits, opportunities, robotics.

The aim

To consider the opportunities and challenges of using modern technogolics and robots in medicine, especially in the medicine of the future.

Material and methods

Original and review articles in the domestic scientific database were retrieved and analyzed.

Results and discussions

The use of artificial intelligence, performing surgical operations without damaging the skin, constant monitoring of the patient with the help of robots, delivery of medicines to the site of injury and inflammation.

Robotics is used in many areas of medicine, including surgery. New technologies allow doctors to perform surgeries with high precision and less traumatization of patients, resulting in shorter recovery time after invasive interventions. With precise movements and the ability to operate with maximum manipulative freedom, robotic surgeons can minimize the risks of surgery. Advanced technologies such as 3D imaging and computer navigation are used in surgery to remove tumors, correct spinal curvatures, and reconstruct muscles and tissues [2].

The use of nanoparticles is gaining popularity in medicine. Due to their unique properties, nanoparticles can be considered ideal for the diagnosis and treatment of various diseases.

Nanoparticles can be used to diagnose and identify the early stages of various pathologies. For example, doctors can place nanoparticles in parts of the body where a tumor is suspected to be developing, after which the nanoparticles will accumulate in the cancer cells. The resulting clusters of nanoparticles could then be detected and studied, and the presence of a cancerous tumor could be determined using special diagnostic tools.

The use of nanoparticles in medicine could also increase the effectiveness of disease treatment. One of the advantages of nanoparticles is the transportation of drugs directly to target cells. Nanoparticles are microscopic in size, which allows them to pass through barriers in the body that normally prevent drug penetration and deliver active substances directly to damaged tissues. This significantly reduces the required dose of the drug and minimizes side effects.

In endoscopy, they can be used for procedures such as biopsy, cauterization of a blood vessel. An exciting advancement in medical robotics involves utilizing nanorobots with receptors that attract bacteria, potentially replacing antibiotics. These nanorobots could target bacteria in the bloodstream or localized infections. [3].

Robotics has plenty of benefits when taking care of patients. First of all, robots can do a monotonous work. For example, taking medication and to keep an eye on patients. Also robots are equipped with sensors and monitoring systems. Due to this robots can recognize a changing of patient’s feeling sooner. Also robots can eliminate a problem such as a communication between the patient and the medical staff. This problem may occur if the patient has a speech disorder [4].

Prostheses have significantly benefitted from advances in new structures and control systems [5]. Robotic limbs with bionic skin and neural interfaces offer users a high degree of control. Robotic exoskeletons (orthoses) are being utilized in rehabilitation to assist paralyzed individuals in walking and correcting deformities [5]. Robots are also being employed in hospital hygiene by using high-intensity UV light for disinfection purposes [5].

The benefits of robotics in the field of medicine.

Robotic technology has the potential to significantly transform the process of drug discovery through automated and high-performance screening methods. This could lead to more rapid and accurate drug development as well as the possibility of targeting specific diseases or medical conditions.

In surgical procedures, the use of robotic technology ensures greater precision, reducing the risk of human error and potential patient harm. This is especially important in complex surgeries where precision is essential.

Additionally, robotic technology can be utilized to develop novel diagnostic techniques that provide enhanced accuracy in data collection and analysis, allowing for earlier detection of diseases and improved treatment outcomes for patients.

The integration of artificial intelligence with robotic systems reduces the likelihood of incorrect diagnoses and subsequent health complications. Nanorobotic technologies in particular can ensure accuracy at a molecular level, enabling the delivery of drugs directly to targeted cancer cells.

Challenges in the Use of Robotics in Medicine:

Despite the advantages of using robotics, there are disadvantages that cannot be ignored. A list of problems that can be encountered:

- The medical staff does not have enough experience to use robotic systems. The development of educational programs and training courses is necessary in order to train medical professionals in the necessary skills to work with these technologies.
- Robotics can pose a danger to patients. Proper operation setup is crucial to prevent accidents.
- The cost of robotics. Currently, the introduction of robotic technologies in medical institutions and hospitals is a problem.

Conclusion

The robotics plays a huge role in medicine. Thanks to robots, the effectiveness of diagnosing various diseases in healthcare will increase, and the treatment of patients will have more favorable prognoses. It is also important to introduce modern robotics into medical institutions. Despite the challenges that need to be overcome, such as ensuring patient safety and training healthcare professionals, the benefits of robotics outweigh the risks. The future of healthcare will be determined by the continued integration of robotics with other advanced technologies. The opportunities for innovation and progress in this area are enormous. In the future, technology will become an integral part of medicine and our lives.

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