

UDC 616-08:681.5

Burka O.¹, Vladimirov A.²

¹PhD, Associate Professor, NU «Zaporizhzhia Polytechnic»

²PhD, Senior Research Consultant, AiMediq S.A., Luxembourg

REHABILITATION ROBOTS: USES AND BENEFITS

Robots in rehabilitation is a rapidly developing field where robotics and medicine are combined to help patients regain lost function after injuries, strokes, surgeries, or neurological diseases. Since the 2010s, these technologies have moved from laboratories to clinics, increasing the effectiveness of treatments and reducing the workload of staff. According to the World Health Organization (WHO), millions of people require rehabilitation every year, and robots are helping to address this challenge.

The main types of robots in rehabilitation are:

1. Exoskeletons – wearable robotic suits that support and enhance movement. They are used to restore gait in patients with stroke or multiple sclerosis. The exoskeleton immobilizes the joints, provides feedback, and gradually reduces assistance, stimulating the brain to retrain (Ekso Bionics, ReWalk).

2. Robotic manipulators and limbs are used to train the arms and legs. They are used after a stroke or traumatic brain injury. The robot repeats movements thousands of times with precise force and speed, which is impossible manually (Lokomat, ArmTutor, LegTutor).

3. Social and telepresence robots are used for motivation and cognitive rehabilitation. They are used in the treatment of dementia, Alzheimer's disease, autism spectrum disorder, etc., primarily to simulate social communication (PARO, Pepper, NAO).

4. Telerehabilitation robots for movement correction via the internet during home rehabilitation (Tyromotion).

Advantages of using robots: intensity and repeatability; objective data; development of sustainable motivation; reduced personnel costs; access to the patient even in remote areas of the planet.

Disadvantages: High cost; Technical limitations; Psychological barriers; Ethical aspects.

Robots do not replace therapists, but complement them, making rehabilitation precise, intensive, and accessible.