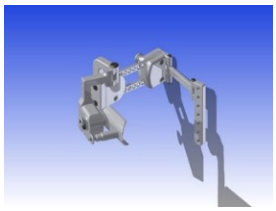
ORTE. Robotics Exoeskeleton for shoulder rehabilitation

Rehabilitation robotics is the best partner for rehabilitation staff



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Technological Offers type

Technological solutions

Research and innovation areas

- Digital Technologies, Artificial Intelligence, Cybersecurity, 5G, Robotics
- Health and Wellbeing

ODS

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Where?

Centre for Automation and Robotics (CAR). Joint UPM-CSIC Centre Robots and smart machines

Keywords: | exoskeleton | Robotics

Brief description of the technology solution and the added value it provides

The human shoulder is the most complex joint in the human body and its diseases are the cause of most sick leave in the workers (men and women) more than double others pathologies. On the other hand, increasing the productive age and aging cause the collapse of rehabilitation services in hospitals and clinics. Rehabilitation robotics is best partner for rehabilitation staff. There are few companies in the world that provide lower limb exoeskeletons, but just one that provide robotic exoeskeleton for upper limb. This solution, besides attending rehabilitation, is an assessment tool on the evolution of the lesion and can be easily tuned for each patient without excessive training of the physiotherapist.

Description of the technological base

Robotics exoskeletons are an important tool for therapists. In recent years, several examples of their use can be found in the rehabilitation of upper limb injuries. The advantage offered by robotic exoskeletons is the capacity to replicate with a patient the movements performed by a therapist during the treatment.

Some advantages of this device are: adaptation to different patients; evaluation of the degree of the injury; recording the patient's progress through motion and force sensors conveniently located; improvement of patient's concentration in therapy.

It can be adapted to different patients and their therapies will be selected by an expert based on the degree of injury and the evolution of the rehabilitation.

"The shoulder and psychiatric pathologies are the most frequent cause of sick leave. The 70% of shoulder pathologies are due to overloading of the rotator cuff"

Market demands

- According to the Spanish Social Security Institute of Employment and Social Security Ministry, musculoskeletal disorders causing the triple of sick leave than all other diseases together. The budgetary allocation to cover the costs caused by work absence due to incapacity exceeded 11.000 million euros in 2013 in Spain.
- International studies show that 50% of women and 33% of men who belong to the active population between 18 and 65 report having a musculoskeletal disorder. They have pain in neck, shoulder, back or waist. Pain is the main cause of prolongation of the temporary sick leave.
- Musculoskeletal disorders are capable of causing psychopathological damages such as anxiety, depression and anguish, so an early diagnosis and all those techniques able to promote and accelerate patient recovery, has a direct impact on reducing the costs caused by sick leave.
- Shoulder injuries are one of the most common diseases that affect the population, and their impact on the employment context is very high compared to other clinical disorders, due to in many labors repetitive tasks are required. These tasks are associated with the overhead of upper limbs.
- The human shoulder is an extremely sophisticated and interrelated system that can produce a wide variety of complex movements and, therefore, is the most difficult to rehabilitate. The device is complex, expensive and needs that the support staff receive extensive training to use with patients.

"Rehabilitation therapies performed by intelligent robotic reduces up to 40% recovery time of a patient"

Competitive advantages

- Low cost device (current commercial solutions can reach the price of 300,000 euros).
- Shoulder rehabilitation.

- Easy to use.
- Easily adaptable to any patient.
- Evaluation of the degree of the injury.
- Recording the patient’s progress through motion and force sensors conveniently located
- Improvement of patient’sconcentration in therapy.

Development stage

- Concept
- Research
- **Lab prototype**
- Industrial prototype
- Production

Contact

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