Medical Technology | Technology Offer

Individually adjustable hand exoskeleton for restoring hand functionalities

Field of application

Limited ability to use the hands due to muscle weakness, loss of muscle strength, apraxia or ataxias, spasticity or other motor skills disorders are symptoms of different diseases, including strokes. This often has a negative impact on the patient's professional and private life. The restoration of the hand functionalities is therefore crucial in order to improve the quality of life of those affected.

State of the art

Hand orthoses are mainly used for the therapy of impaired and paralyzed hands in order to maintain remaining functionalities or to restore the ability to grasp and hold things, for example. Glove systems with motorized pull/push systems also offer additional functionalities, such as opening and closing the hand or moving individual fingers.
However, such motor-assisted solutions are usually not suitable for everyday use. It is often necessary to create bulky superstructures for pressure tanks and compressors or to provide additional external modules, which must then be attached to wheelchairs, for example. Stroke patients may also have hands and fingers bent by spasms, making it difficult or even impossible for them to put on such a glove.

Innovation

As part of a project funded by the Baden-Württemberg Stiftung gGmbH, scientists from the Institute of Industrial Manufacturing and Management (IFF) at the University of Stuttgart have developed a hand exoskeleton that can be used to restore the gripping ability of a paralysed hand. The hand exoskeleton consists of a central assembly unit and individual, movable finger modules, which can be adjusted to the specific conditions of the hand (such as finger shape and length).
The exoskeleton is compatible with a large number of sensor inputs (such as EEG, EOG or EMG). Therefore, it can be tailor-made to meet the user's specific needs. In addition, the patient can easily put on the exoskeleton without additional help, making it the ideal daily companion. The lightweight exoskeleton is also comfortable to wear.

Patent portfolio

A German patent application is pending.

Your benefits at a glance

- ✓ Recovery of hand functionalities
- ✓ Individually adjustable to the entire hand and individual fingers as well as to hand and finger shape
- ✓ Compatible with common sensor input systems
- ✓ Suitable for everyday use: can be put on by the patient himself/herself

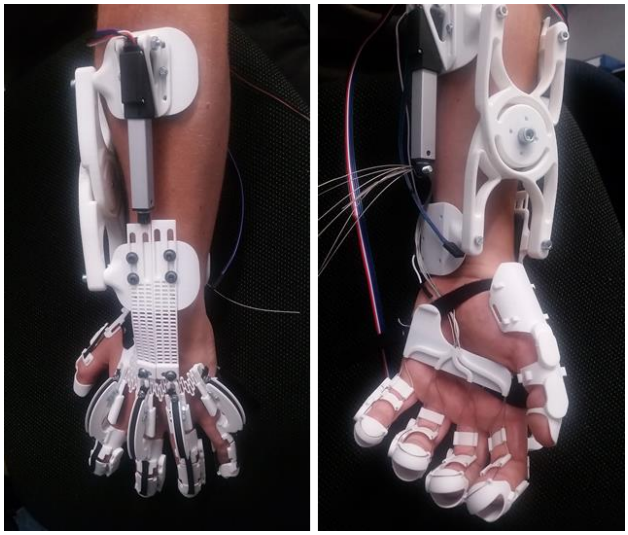

Figure: Patient using a prototype of the lightweight hand exoskeleton [University of Stuttgart].

Technology transfer

TLB GmbH manages inventions until they are marketable and offers companies opportunities for license and collaboration agreements.

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