



GRAB YOUR LIFE

EYE TRACKER TECHNOLOGY
RECOGNIZES WHAT THE
PATIENT IS LOOKING AT

NEUROCOGNITIVE
EXERCISES

MOBILIZATION
3D ANIMATION
ACTION-OBSERVATION THERAPY

EVALUATION SECTION AND
PERFORMANCE REPORT

INTERACTIVE GAMES FOR
THE WHOLE UPPER LIMB

FUNCTIONAL
EXERGAMES



AIDA



CRESCENDO



ARIA

AND THE REHABILITATION
CONTINUES AT HOME WITH
CONCERTO

PASSIVE HAND
MOBILIZATION

PORTABLE, ALSO FOR
BEDRIDDEN PATIENTS

BIMANUAL MIRROR
TRAINING

ACTIVE-ASSISTED
AND MOBILIZATION

MAESTRO

SINFONIA

MAESTRO

Maestro is the hand mobilization device that can be used both in an early phase on bedridden patients, even if the patient has no residual active movement, and subsequently to support the recovery of functional actions with real objects.

INTENSIVE AND
EARLY MOBILIZATION

TRANSPORTABLE
TO BEDSIDE



MAESTRO is easily **transportable**. It may be placed:

- **next to the patient's bed**, allowing rehabilitation treatment to begin already in the acute phase,
- **in the rehabilitation gym**, to carry out treatments with patients in a sitting or standing position,
- **in an occupational therapy room**, to help patients train in activities of daily living (ADL).

The core of Maestro is the **rehabilitation glove**, which can generate both flexion and extension of fingers. Depending on the stage and setting of the treatment, during mobilization, the patient can either watch a 3D simulation of the hand in motion on the screen, designed to stimulate neuroplasticity, or concentrate on his hand and the objects he is invited to interact with.

The patient is **not constrained** to a predefined position: wrist and arm can be moved freely by the patient during therapy.



The **software** offers a wide range of possibilities to customize the therapy.

The clinician can adjust:

- passive ROM for each finger,
- speed (6-20 mm/sec),
- exercise timing,
- audio-video effects,
- all the combinations of finger flexion-extension.



Early and intensive mobilization can prevent dysfunctional reorganization of brain activity, as well as avoid the occurrence of adhesions, contractures, immobilization damages, improve joint metabolism and lymphatic and blood circulation, maintain and increase joint ROM.

The silicone gloves, which are easy to sanitize and available in 6 sizes (XXS, XS, S, M, L, XL), leave **the palm free**, to facilitate fitting even in case of spasticity, avoid grasping reflex, limit sweating and facilitate grasping of objects.

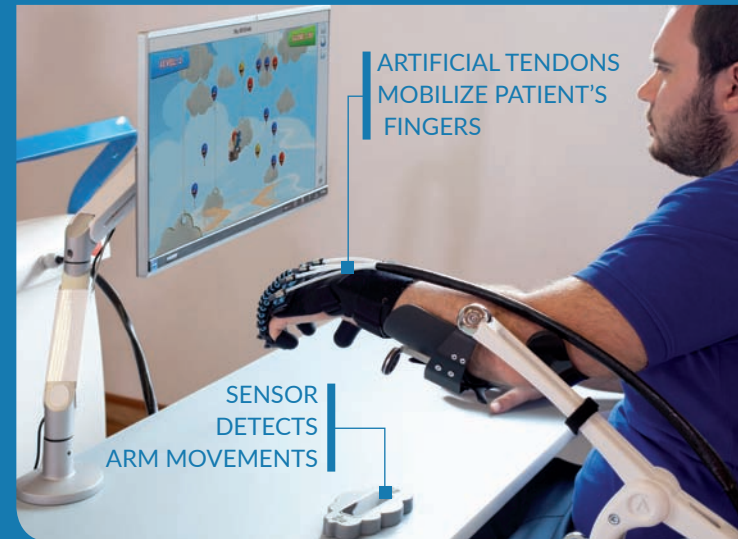
CRESCENDO is an extremely **versatile device**, applicable to a wide range of patients, with neurological and orthopedic deficits, that offers:

- **Passive mobilization hand therapies:** they are ideal both for starting treatment, even in absence of active movements, and for patients who are at a more advanced stage and need to rehabilitate functional gestures. The rehabilitation glove generates fingers flexion-extension even in case of hypotonia or hypertonia (max MAS=3). The 3D simulation on the screen involves the patient, facilitates his body awareness, helps him to maintain and rebuild the hand cortical representation.

- **Interactive games:** they can involve the entire upper limb, are useful for training the patient's active movements and refining his motor control and coordination skills. The software also proposes exercises developed in collaboration with a team of neuropsychologists, to focus the treatment on recovering selective attention, divided attention, problem-solving, memory, shifting, and visual-spatial exploration skills.

- **AOT (Action-Observation Therapy):** Crescendo allows the execution of exercises based on the logic of AOT for the activation of mirror neurons. In this case, the session consists of two steps: first, the patient observes a motor task on the screen; once the visual preview is over, the rehabilitation glove supports the specific motor exercise performance.

- **Functional Exergames:** Crescendo is the only device that, inspired by the Soft Robotics principles, can offer an original method of functional therapy: the patient can actively move his arm with no gravity; when he reaches the target area, the rehabilitation glove intervenes to support fingers flexion or extension of fingers. It is thus possible to simulate complex reaching actions involving the proximal district and distal extremities.



- **Assessment module:** the software stores all treatment sessions. Intuitive reports on performance levels can be viewed and downloaded for each patient. Wrist ROM (pronation-supination, flexion-extension and ulnar-radial deviation) can be easily evaluated, day by day.



CRESCENDO

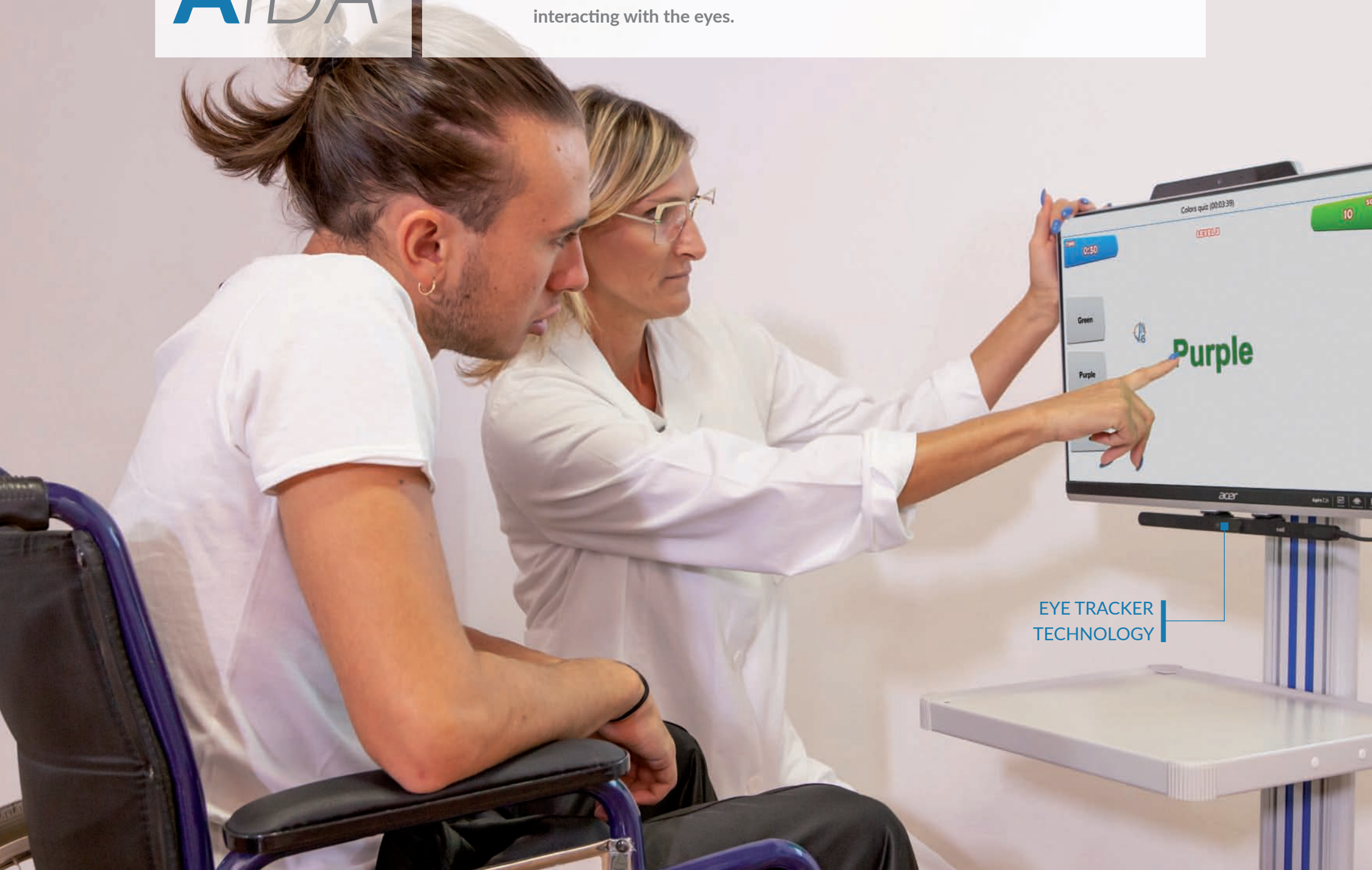
Crescendo is an integrated solution offering finger mobilization therapies and interactive games for neurocognitive treatment, motor training of hand, wrist, and fingers, and recovery of complex functional gestures.

THE ARM WEIGHT IS
COMPENSATED BY THE
ADJUSTABLE SUPPORT

SILICONE REHABILITATION
GLOVE ENSURES
MAXIMUM HYGIENE

AIDA

Aida is the next-generation device for neurocognitive learning and rehabilitation, based on eye-tracking: the patient trains his mind by simply interacting with the eyes.



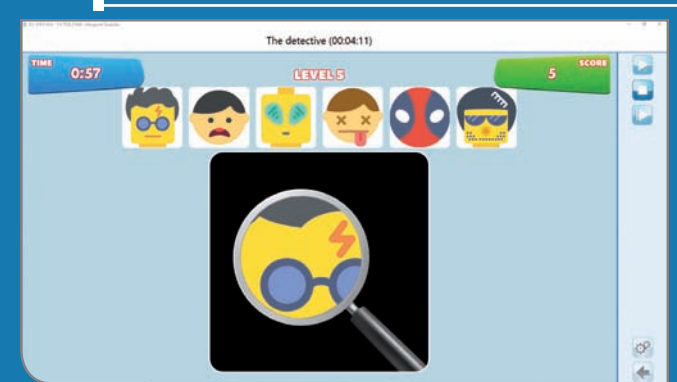
EYE TRACKER
TECHNOLOGY

AIDA recognizes what the patient is looking at. On the device screen, exercises and games with different degrees of complexity are proposed: the patient is the protagonist of his treatment session through eye interaction. The Aida infrared eye-tracker, positioned at the base of the screen, reads eye movement and interprets the patient's choices in response to the stimuli proposed each time.

- The use of Aida enables the neurocognitive rehabilitation process to begin at an early stage of treatment, promoting an earlier stimulation.
- Treatment starts after a quick calibration session.
- The software automatically adapts exercises' difficulty levels according to the patient's performance and allows the therapist to customize parameters to optimize the rehabilitation session's effectiveness.

This technology enables to propose neurocognitive exercises to patients with a diversified medical history, thus ensuring that the complexity of patients with neurological disorders can be better managed:

- patients who are not allowed to use the verbal channel,
- patients with severe paralysis of voluntary limb movements,
- patients with neurodevelopmental disorders,
- patients for whom early fatigue makes it difficult to perform certain exercises.



The software proposes many exercises developed in collaboration with neuropsychologists and are designed to train:

- selective attention,
- divided attention,
- shifting skills,
- memory,
- visual-motor skills such as the ability to stare at and follow visual stimuli,
- eye movements,
- visual-spatial exploration skills.



SINFONIA

Sinfonia is the most advanced device for functional hand rehabilitation, equipped with a robotic glove able to mobilize fingers, detect patient's active movements and perform mirror bimanual training.

SENSORIZED GLOVE
ON FINGERS ACTIVELY
MOVED BY THE PATIENT

ROBOTIC GLOVE ON THE
HAND WITH MOTOR DEFICIT



SINFONIA robotic glove can work in different modes:

- **BIMANUAL MIRROR TRAINING:** thanks to Sinfonia, even the hemiplegic patient can actively guide the exercise. The movements of his 'healthy' hand are recognized by the device and reproduced on the contralateral limb through the robotic glove.
- **PASSIVE:** finger flexion and extension are generated by the robotic glove according to customizable parameters. Mobilization is supported by multi-sensory stimulation (3D animation, sound effects, musical accompaniment, voice guidance, interaction with objects) to ensure patient involvement and to extend the cortical areas reached by neuroplasticity mechanisms.
- **ACTIVE-ASSISTED:** proposed exercises require the patient to initiate a motor task autonomously; the robotic glove follows the patient's activity and the motorized system intervenes to help only when necessary. Performance indicators give immediate feedback on the patient's degree of autonomy in flexion and extension.
- **ACTIVE:** Serious games motivate the patient to do his best to exploit his distal active ROM. Exercises train fist closing, hand opening, single finger flexion-extension, and tridigital pinch. Intuitive graphs at the end of the exercise show the patient and therapist the recorded trend, session after session.

Main features:

- Finger **flexion and extension** are dynamically activated by the patient, to increase his degree of involvement and motivation.
- The **cortical areas stimulation** is amplified by the mirror mechanism, by observing the 3D hands in movement and by performing serious games and functional tasks with real objects.
- Compared to traditional **Mirror Therapy**, Sinfonia enables one to go beyond the movement illusion: real motor training can be generated by the robotic glove on the hand with a motor deficit, increasing the rehabilitation potential.

▪ THERAPIST-DRIVEN MOBILIZATION:

Sinfonia allows the therapist to wear a glove endowed with sensors to **dynamically guide** the movement of the passive mobilization glove on the patient's hand.

Timing and amplitude of finger flexion and extension movements are therefore managed by the operator in real-time, allowing the therapy to be constantly customized, depending on the patient's response and specific motor task proposed.

The master-slave logic application amplifies the rehabilitation glove potential, synergizing with the relationship of trust and complicity between therapist and patient.

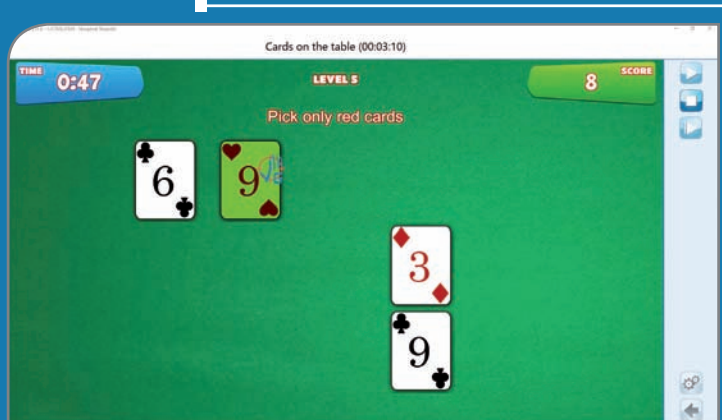


- According to the logic of **Action-Observation Therapy**, exercises with Sinfonia can require the observation of a motor task video before the exercise itself is performed. The software includes a wide range of videos: from single-joint movements to more complex actions.
- The operator creativity is maximized, allowing the execution of **grasping and reaching exercises with real objects**, often taken from everyday life and professional environment.

ARIA offers cognitive exercises and interactive games focusing on free arm, wrist and hand movements.

The patient moves his upper limb in space, in absence of gravity.

The set-up is immediate: nothing to wear on the patient.



Motor recovery is never separate from **neurocognitive** recovery.

Aria proposes exercises, inspired by tests and activities typical of neuropsychological treatment, to train selective attention, divided attention, shifting abilities, visual-spatial exploration skills, memory, etc.

Colours, numbers, images, playing cards: the software proposes interactive cognitive stimulation exercises, tailored to the patient. The playful aspect and the combination of motor tasks facilitate the compliance level of the patient with cognitive deficits.

Rehabilitate while having fun: the software offers several **challenging and recreational exercises** based on active upper limb movements detected by a specific sensor.

- The graphic interface involves the patient and enhances the playful aspect of the treatment.

- The motor exercise is carried out within an immersive context: the patient guides a character in the execution of tasks of varying complexity or controls a cursor in the solving of quizzes of increasing difficulty.

- The exercise **difficulty level** can be programmed by the therapist or can auto-adjust based on the patient's performance.

- Patients and therapists have immediate feedback on the performance trend.

- The level of compensation is calibrated according to the weight of the arm and the patient's residual capacity of control and movement.

Range of movements detected by Aria:

- finger flexion-extension,
- wrist pronation-supination,
- radial-ulnar deviation,
- wrist flexion-extension,
- arm movements in vertical and horizontal planes (back-forth, right-left, up-down).



ARIA

Aria is the sensor-based device for therapeutic upper limb treatment and neurocognitive training.



CONCERTO

Concerto is the technological solution to guarantee the patient's continuity of active rehabilitation treatment of the upper limb, from hospital to home, with remote control by the clinical specialist.

Thanks to **CONCERTO** rehabilitation therapy **does not end** when the patients are discharged. The same **motor and neurocognitive exercises** that the patients learned to do in the gym with Aria are available at home, under the supervision of the same professional who took care of them during the treatment period in the facility.

Patients at home carry out rehabilitation sessions set by the clinical specialist. The possibility of customizing parameters and the auto-adaptive level of difficulty of the proposed interactive games ensure continuity of motivation and involvement, even in home treatment.

A set of ready-to-use tools at the patient's home:

- a portable PC with dedicated software already installed,
- a sensor able to detect free movements of the upper limb in space,
- a dynamic support that compensates the arm weight.

No initial calibration is required from the patient, nor does the caregiver need to carry out any setting up or adjustment. Once the sensor is connected to the PC, therapy can begin immediately.

The **asynchronous remote control** does not oblige practitioners and patients to be connected simultaneously: at any time the rehabilitation specialist can view sessions data performed by each patient, evaluate results, download report files (pdf or xls), and modify exercise parameters.

The patient has the security of always performing up-to-date therapies according to the latest clinical prescription.

Thanks to Concerto, the network between the rehabilitation centre and the territory is strengthened: a simple and reliable system that guarantees patient data protection and privacy and facilitates the preservation and improvement of the clinical results achieved through treatment in the gym.

PATIENTS CAN CONTINUE REHABILITATION TREATMENT AT HOME, WITH OR WITHOUT DYNAMIC ARM SUPPORT



CLINICAL EFFICACY
PROVEN BY SCIENTIFIC
PUBLICATIONS

ON THE MARKET
SINCE 2011

INTERNATIONAL
PARTNERS

MORE THAN 10,000
PATIENTS TREATED
EVERY YEAR

MADE IN ITALY

GLOREHA SOFTWARE

Involves the patient with audio and visual effects, 3D movement simulations, engaging, challenging, and fun serious games



Provides feedback on the patient's performance and stores all therapies



Enables the therapist to upload new videos to be shown as preview and tutorial before the motor exercise



Allows customizing the exercises, adapting to the peculiarities of each patient from time to time



Guides the patient through customizable vocal messages



CLINICAL REFERENCES



Dr. Luciano Bissolotti
Domus Salutis Rehabilitation Center
Italy

“ I had the opportunity to realize how much the robotics, in particular Gloreha, was able to quickly act to the mutual satisfaction of the clinician and the patient. In particular, within a few sessions, it was immediately possible to record a reduction in focal spasticity with a significant reduction in the Ashworth scale values ”



Dr. Franco Molteni
Villa Beretta Rehabilitation Center
Italy

“ The movement is experienced, imagined and perceived by the patient, thanks to the execution of activities the glove makes possible ”



Ulrich Thiel
Hellmuth & Thiel Praxis
Germany

“ Gloreha glove offers the patient the possibility to feel the object, grasp it autonomously and to benefit of a high quality proprioception stimulation ”



Tatiana Jeglic
Center Fizioterapije Ljubljana
Slovenia

“ I chose Gloreha because it allows the patients to really feel and manipulate the objects, and also bimanual or bilateral activities. We can really improve their ability to perform their daily life activities in better quality of movement ”



MULTIDISCIPLINARY REHABILITATION PROJECT



GLOREHA DEVICES FOR ALL PHASES OF REHABILITATION



GLOREHA IS AGELESS: CHILDREN AND ADULTS



COMBINED FUNCTIONAL, COGNITIVE AND MOTOR REHABILITATION

Stay up-to-date on our news

www.gloreha.com     

Clinical indications

Gloreha devices are extensively used on neurologic patients with motor and/or cognitive deficits. They can be effectively applied in sub-acute as well as in chronic phase to support distal, proximal, functional and cognitive recovery.

The most frequent indications are: Stroke, Traumatic Brain Injury, Spinal Cord Injury, Cerebral Palsy, Parkinson's Disease, Peripheral Neuropathies, Neurodevelopmental Disorders.

Gloreha devices can also be useful supports in the treatment of patients with **musculoskeletal disorders** and in the post-operative stage.

“ According to recent literature, the hand rehabilitation program with Gloreha provides an intensive, repetitive, functional, task oriented, specific, and customizable treatment. [...]

The exercises with devices work on plasticity in the central nervous system due to the neuromotor, audiovisual feedback: the multisensory action-observation system enables patients to re-learn impaired motor function through the activation of internal action-related representations. [...]

Our results showed a great improvement on the ADL and positively marked functional recovery of motor function. An important aspect of our study was the association of robotic therapy with the traditional rehabilitation-based approach of physiotherapy and OT to provide more full and intensive sessions to improve the outcome. ”

Milia P, Peccini MC, De Salvo F, Sfalderoli A, Grelli C, Lucchesi G, et al. Rehabilitation with robotic glove (Gloreha) in poststroke patients. Digit Med 2019;5:62-7

“ Robot-assisted training using the Gloreha device demonstrated beneficial effects on body structure and function, including upper extremity motor function, brachioradialis muscle recruitment, and coordination, in children with Cerebral Palsy. The beneficial effects were maintained 1 month after training termination. ”

Kuo FL, Lee HC, Hsiao HY, Lin JC. Robotic-assisted hand therapy for improvement of hand function in children with cerebral palsy: a case series study. Eur J Phys Rehabil Med. 2020 Apr;56(2):237-242. doi: 10.23736/S1973-9087.20.05926-2. Epub 2020 Jan 14. PMID: 31939267.

“ Gloreha glove is feasible and effective in recovering fine manual dexterity and strength and reducing arm disability in sub-acute hemiplegic patients. [...] Patients in the treatment group significantly improved the motor function of the paretic upper limb (Motricity Index), their coordination and mono-manual dexterity (Nine Hole Peg Test) and strength (Grip and Pinch) in contrast to controls, and the cost savings was considerable. ”

Vanoglio F, Bernocchi P, Mulè C, Garofali F, Mora C, Taveggia G, Scalvini S, Luisa A. Feasibility and efficacy of a robotic device for hand rehabilitation in hemiplegic stroke patients: a randomized pilot controlled study. Clin Rehabil. 2017 Mar;31(3):351-360. doi: 10.1177/0269215516642606. Epub 2016 Jul 10. PMID: 27056250.

Clinical benefits

- Maintenance and improvement of the joint range
- Proprioceptive stimulation
- Improvement of visual-spatial and attentive skills
- Increase in functional independence
- Reduction of pain, oedema and hypertonia
- Prevention of adhesions, contractures, and immobilization damages
- Improvement of joint metabolism, lymphatic and blood circulation
- Maintenance of functional skills and body perception
- Increase in coordination and dexterity
- Increase in grip and pinch strength





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