

Congregation of the Sisters Nurses of Our Lady of Sorrows, Valduce Hospital, Department of Physical Medicine and Rehabilitation, "Villa Beretta" Rehabilitation Centre

Description of the organization:

The Villa Beretta Rehabilitation Center, Department of Physical and Rehabilitation Medicine of Valduce Hospital, is a structure dedicated to the recovery of the best possible functional condition of people with problems deriving from disability due to genetic or acquired neurological diseases. Such complex activity is centered on the person, on the family of the disabled person and on their social nucleus. It is oriented towards the improvement of the person's autonomy, the social participation and the quality of life, in order to guarantee the dignity of each person.

"Villa Beretta" Rehabilitation Centre is a reference centre in the field of neuro-motor *rehabilitation, gait analysis and telemedicine* in Italy. Its main objective is to improve the quality of life of patients and caregivers, giving them the opportunity to perform an integrated rehabilitation clinical pathway aimed at the recovery of some body structures and/or functions, as well as to improve the participation in community activities.

Main target of the Centre is the patient with some kind of neuro-motor disease/disability. Using leading edge technology from diagnosis to treatment and follow-up, the Centre offers the possibility to recover as much ADL (Activities of Daily Living) autonomy as possible depending on entrance conditions of patients.

Each person has his/her own tailor-made recovery project, coordinated by medical doctors specialists in Physical Medicine and Rehabilitation, in collaboration with other colleagues coming from different branches such as neurology, neuro-surgery, orthopedics, plastic surgery, urology, pulmonology, cardiology and dietetics. All the team is supported by specialized physiotherapists, speech therapists, psychologists, neuro-psychologists, bio-engineers, orthopedics technicians, nurses and social assistants.

During in-hospital stay patient is stimulated to search for and use all his/her residual capacities and resources in order to develop the maximum potential of recovery of impaired functions.

From the clinical perspective, the most advanced technology is used, from diagnosis to monitoring to aids and personal tutors and orthosis, to robotics, augmented reality, virtual reality and home-rehabilitation systems in order to facilitate continuous care program when patients go back home.

The most important set of activities is associated with the direct service to patients and caregivers: Motion Laboratories Analysis for lower and upper limbs diagnosis and treatment; the use of tailor-made orthosis combined with focused physiotherapy programs, pharmacological and/or surgical interventions, art, harp and dance therapies, possibility of performing long term follow-up at patient's home using telemedicine infrastructure with an almost zero-cost for the patient, and caregiver specific training are some of the innovative elements that allow the Centre to offer an integrated tailor-made clinical pathway even after hospital discharge.

Main treatments are oriented towards neuro-muscular pathologies such as:

- spinal cord injury or disease,
- traumatic brain injury and brain-related diseases,
- stroke survival,

- neurodegenerative diseases such as multiple sclerosis, amyotrophic lateral sclerosis, Parkinson's disease,
- genetics-based pathologies such as Ataxias and other pathologies involving the gradual loss of functional capacities.

Rehabilitation clinical pathways may be performed either on an in-hospital modality, on a daily-based presence modality (out-patient), at patients' home and/or a combination of them.

Each patient passes through a specific diagnosing process which may include (depending on the case):

- Identification of general clinical condition of the patient,
- Neuro-motor assessment (posture balance, upper/lower limb functionality, trunk control),
- Neuro-muscular instrumental evaluation (dynamic electromyography, movement analysis, kinematics, kinetics),
- Nutrition assessment (nutrition index, deglutition structure and function),
- Urinary system clinical and functional evaluation, neurological assessment of pelvic floor,
- Assessment of respiratory function,
- Neuro-psychological and cognitive assessment,
- Clinical scales application depending on the specific pathology.

Main treatment combinations may include:

- Chemodenervation using traditional as well as innovative pharmaceutical products (botulinum toxin),
- Neuro/orthopedics surgery for functional or cosmetics purposes,
- Direct programmable system of intrathecal infusion,
- Robotic assisted physiotherapy,
- Traditional physiotherapy,
- Psychological support/treatment,
- Speech therapy and/or neuro-cognitive treatments for aphasia, neglect, dysarthria, problem solving, alternative augmentative communication,
- Respiratory functional support/recovery,
- Taylor-made orthosis and assistive devices,
- Nutritional treatments,
- Urinary system functioning treatments,
- Specific skin ulcers prevention and treatment.

Other rehabilitation services provided:

- Diagnostic imaging: traditional radiology, magnetic resonance imaging, computerized axial tomography, ultrasound, echo Doppler, computerized bone mineral density.

- In-door and out-door gyms usable with/without wheelchair
- Techno-gym: includes robotics and mechatronics devices available both for research and for treatment activities.
- International telemedicine service: oriented towards evidence-based clinical practice and research, this service is offered through a low-cost web-based system, in order to contact patients and caregivers for activities of training and clinical follow-up in a full privacy protected environment.

All such services are offered in a completely paperless environment, based on an Electronic Medical Record System that allows all healthcare operators to access real-time needed patient's information.

Research activities

One of the main activities of the Centre is dedicated to research related to clinical as well as organizational issues. Examples of most recent research activities are:

- Health Innovation Technological Network@Lecco - (2005-2007),
- "Servizi e Percorsi Innovativi che Definiscono un Ecosistema Riabilitativo", SPIDER@Lecco (2010-2013), (Services and Clinical Pathways that Define a Rehabilitation Eco-system)
- HEAD: Human Empowerment, Aging and Disability (2014-2017),
- MUNDUS (2010-2013). MULTimodal Neuroprosthesis for Daily Upper limb Support. Seventh Framework Programme. Theme: Information and Communication Technologies. ICT-2009.7.2 – Accessible and Assistive ICT
- INCOGNITO I and II: Integrated Cognitive, Sensory, and Motor Rehabilitation of Hand Functions (2014-2021),
- RETRAINER (2015-2018). REaching and grasping Training based on Robotic hybrid Assistance for Neurological patients: Endusers Real life evaluation, Horizon 2020. Innovation Action.
- EMPATIA (2017-2020): EMPATIA@Lecco : Empowerment del PAziente In cAsa. (Empowerment of patient at home)
- TUTA (2017-2019): "New multi-parameter wearable system for monitoring and evaluating the rehabilitation act and the reintegration of people"
- USEFUL (2017-2019): User- centred assistive SystEm for arm Functions in neUromuscuLar subjects
- PROGAIT (2018 – 2021) Physiological and Rehabilitation Outcomes: Gains from Automated Interventions in stroke Therapy. DESCA, Horizon 2020.
- ARTE (2018-2019): EEG Anlysis of Robotic Treatment.
- ReHyb (2020 – 2024) Rehabilitation based on Hybrid neuroprosthesis, Horizon 2020, Call: H2020-ICT-2018-2020, (Information and Communication Technologies).