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PARKINSON DISEASE PATIENT

Name of the center	Casa di cura privata Le Terrazze srl
Description of the center	Casa di Cura Le Terrazze is an institute of hospitalization and specialized rehabilitation care. It is located in Cunardo at around 13 km from Varese. The hospital provides different rehabilitation services in in- or out- patients regimen. The center boasts different rehabilitation facilities: neuromotor rehabilitation, Parkinson rehabilitation, rehabilitation after spine surgery, cardiac rehabilitation, respiratory rehabilitation and a private rehabilitation clinic. hunova is used for the evaluation and rehabilitation of neurological and orthopedic patients, with a particular interest in Parkinson patients, post spine surgery rehabilitation, post ankle and knee surgery rehabilitation.
Authors	L. Pendolino (MD), L. Salvato (MD)
Patients description	70 years old female, Parkison disease (IV Hoen and Yahr score)
Aim	To improve postural and trunk control in seated position
Sessions	Evaluations were performed at the beginning (T0), after five training sessions (T1) and at the end of the treatment (T2). The evaluations included in the silver index method were used and the training sessions were planned according to its suggestions. Robotic training: Eleven - 1 hour sessions. Sessions were focused on the impaired functional areas computed during evaluations: static and dynamic balance with open and closed eyes and reactive balance.
Results	Dynamic balance and gait speed functional areas improved, at the end of the training program. The gait speed increases after the treatment (50% of improvement).
Patient's feedback	The athlete performed much better during the season, and he felt more confident on relying on the right ankle while playing basketball. We are very happy about the performance index because it helps us to identify functional deficits that affect physical performance. After the identification, this instrument gives us also the training solutions.

ACQUIRED BRAIN INJURY (ABI) PATIENT

Name of the center	Master Thesis of two physiotherapists
Authors	M. Burlando (PT), B. Bollo (PT)
Patients description	20 years old woman, chronic ABI
Aim	Increase ankle ROM and strenght; Improve two and one leg balance
Sessions	Clinical (hip and ankle ROM, Medical Research Council (MRC) scale for muscle strength, Mini-BESTest, Timed Up and Go test, 10 Meters Walking Test, Montreal Cognitive Assessment) and robotic assessment (two-legs stance: static and dynamic balance test with open and closed eyes, limits of stability, reactive balance; ankle evalutations: Ankle ROM in standing position (with load), Ankle ROM sitting (without load), Isometric test; five times si to stand). Robotic training: 10 sessions (2 sessions per week, 5 weeks). Sessions were focused on balance on one and two legs in static and dynamic conditions, execution of dual tasks, lower limb and ankle strengthening, sitting postural control in static and dynamic conditions and core stability.
Results	Subject improved her performance in terms of gait speed (20%) and ankle range of motion (46%) assessed by physioterapists and control of balance in robotic tests.
Patient's feedback	The patient expressed her satisfaction with the use of hunova, also highlighting benefits in the activities of daily life and sports, managing to perform some exercises that she could not do before.

SPINAL CORD INJURY (SCI) CHRONIC PATIENT

Name of the center	ASST Grande Ospedale Metropolitano Niguarda, Unità Spinale Unipolare, Milan
Description of the center	The Spinal Unit (USU) at Niguarda Hospital in Milan, Italy, is a professional and multidisciplinary facility which aims at facing and satisfying the assistance, the therapeutic, rehabilitative and psychosocial needs of the people who suffered from a traumatic or non-traumatic spinal cord injury (SCI). The activities that take place at USU deal with every aspect of this kind of disability, involving breathing, nutrition, neuro-motor activities, bowel and bladder management, and psychological and sexual issues hunova is used for the evaluation and treatment of SCI patients, the activities are focused in improving their trunk control.
Authors	A. Leo (MD), M. Spinelli (MD)
Patients description	46 years old male patient with complete neurological loss: no motor or sensory function (ASIA A), dorsal lesion (D11), in chronic state (distance from the acute event: 20 years).
Aim	To improve postural and trunk control in seated position
Sessions	Clinical (SBASCI and SCIM) and robotic assessment (Static and dynamic sitting posture with open and closed eyes; active control of movement with the trunk limits of stability test). Traditional and robotic training: 20 sessions (2 sessions per week, 10 weeks). Sessions were focused on postural and trunk control in different dynamic conditions, Dual-motor-task with movements of the upper limbs, core stability and strengthening.
Results	The score of the sitting balance assessment for spinal cord injury (SBASCI) scale improves from 29 to 37.5. At the end of the treatment the subject increases her performance in executing the robotic evaluations.
Conclusions	A chronic SCI subject with a complete lesion, with well defined and consolidated compensation strategies, has benefited in a very positive way from the treatment with hunova, in terms of both pelvis and trunk control. Balance, stability and trunk control can influence the patient's safe wheeled mobility. This resulted in improved functionality, independence and social integration of the patient, despite his chronic condition.

ROBOTIC KNEE ARTHROPLASTY

Name of the center	Clinica San Francesco S.p.A. - Casa di Cura Privata
Description of the center	The "Clinica San Francesco", thanks to the establishment of the CORE, the European Robotic Orthopedics Center, is a point of reference in knee surgery. The orthopedic surgery department has a physiotherapy and rehabilitation clinics, available for both inpatients and outpatients. The physiatrists and physiotherapists of the San Francesco Clinic develop, in collaboration with the surgeons who performed the operations, personalized rehabilitation physiotherapy paths to better face the post-operative course. hunova is used in this intervention for the evaluation before the arthroplasty and follows the treatment intervention with assessment and treatment sessions after the implantation.
Authors	A. Di Matteo (MD), F. Bonazzi (PT), E. Maschi (PT), P. Perazzini (MD)
Patients description	24 subjects who underwent a robotic knee replacement surgery and rehabilitation process. 12 subjects followed the conventional rehabilitation practice (Group 2) and 12 subjects added 8 sessions with hunova (Group 1).
Aim	To examine the effect of a hunova rehabilitation program among patients after knee arthroplasty surgery.
Sessions	The protocol consists of a pre-intervention assessment session (T0), a post-intervention intensive inpatient rehabilitation program (8 sessions, 4 sessions per week, 2 weeks), a pre-discharge clinical evaluation (T2) and a robotic assessment at follow up 3 months after surgery (T3). Clinical (Barthel Index, BI; Knee Rating Scale, KRS; Numeric Pain Rating Scale, NPRS; T0 and T2) and robotic assessment (two-legs stance: static balance test with open and closed eyes and reactive balance; five time sit to stand; T0, T2 and T3) was executed.
Results	Group 1 has better results, compared to Group 2, in orthostatic stability, postural passages such as sit to stand and in reactive balance at 3 months follow up.
Conclusions	hunova promotes long terms outcome in patients after knee arthroplasty surgery. hunova is an effective support for the entire rehabilitation process: preoperative assessment, personalized treatment and follow-up evaluations.

POST-SURGERY ANKLE FRACTURE

Name of the center	Casa di Cura Privata Le Terrazze Srl
Description of the center	Casa di Cura Le Terrazze is an institute of hospitalization and specialized rehabilitation care. It is located in Cunardo at around 13 km from Varese. The hospital provides different rehabilitation services in in- or out- patients regimen. The center boasts different rehabilitation facilities: neuromotor rehabilitation, Parkinson rehabilitation, rehabilitation after spine surgery, cardiac rehabilitation, respiratory rehabilitation and a private rehabilitation clinic. hunova is used for the evaluation and rehabilitation of neurological and orthopedic patients.
Authors	V. Da Pieve (MD), E. Tanco (PT), F. Rossi (PT)
Patients description	48 years old female, admitted to our rehabilitation facility 1 month after surgery for an ankle fracture.
Aim	To improve ankle ROM, force and balance performance.
Sessions	Evaluations were performed at recruitment (T0), at the end of the treatment (T1) after a 2-month interval and at a 6 month follow up (T2). The assessment consisted of robotic evaluations on hunova always performed bilaterally in order to perform comparisons. Robotic evaluations were divided in ankle (range of motion and isometric and isokinetic force) and balance (two-legs static balance, reactive balance and limits of stability) assessment. Robotic training: 8 sessions (30 minutes sessions, 2 sessions per week, 1 month). Sessions were focused on one-leg and two-legs balance training in different dynamic conditions, lower limb general strengthening, and ankle training (range of motion, strengthening and control of dynamics).
Results	The left ankle perfomance improves in terms of ROM and isometric and isokinetic force, and it reaches a good symmetry with the right ankle (<10%). Consequently, balance control increases.
Conclusions	hunova treatment significantly promotes the reaching of the bilateral symmetry after an ankle fracture.

POST STROKE BALANCE ASSESSMENT AND TRAINING THROUGH SI METHOD

Name of the center	Riattiva srl
Description of the center	Riattiva is a rehabilitation outpatient center. It is located in Lavagna at around 30 km from Genoa. The center provides different rehabilitation services. It provides avant-garde spaces and equipment and specialized professional figures. The patient is followed and treated with a detailed rehabilitation program with a view to obtaining results that are increasingly in line with the patient's expectations, thus expanding the positive outcome of the various therapeutic interventions. hunova is used for the evaluation and rehabilitation of neurological and orthopedic patients.
Authors	M. Escelsior (PT), A. Fochi (PT), D. Zolezzi (PT)
Patients description	60 years old male.
Aim	To improve balance.
Sessions	Evaluations were performed at the beginning (T0), after five training sessions (T1) and at the end of the treatment (T2). The evaluations included in the silver index method were used and the training sessions were planned according to its suggestions. Robotic training: Eleven - 1 hour sessions. Sessions were focused on the impaired functional areas computed during evaluations: static and dynamic balance with open and closed eyes and reactive balance.
Results	Dynamic balance and gait speed functional areas improved at the end of the training program the gait speed increases after the treatment (50% of improvement).
Conclusions	The personalized analysis of the functional deficits proposed with the silver index helped us to create the appropriate treatment for our patient in order to reduce deficits specifically working on his impaired areas. We kindly suggest using silver index with all elderly patients to assess their physical state as a function of their advancing age.

HUNOVA FOR PERFORMANCE OPTIMIZATION OF A SOCCER PLAYER

Name of the center	Riattiva srl
Description of the center	Riattiva is a rehabilitation outpatient center. It is located in Lavagna at around 30 km from Genoa. The center provides different rehabilitation services. It provides avant-garde spaces and equipment and specialized professional figures. The patient is followed and treated with a detailed rehabilitation program with a view to obtaining results that are increasingly in line with the patient's expectations, thus expanding the positive outcome of the various therapeutic interventions. hunova is used for the evaluation and rehabilitation of neurological and orthopedic patients.
Authors	P. Barbero (PT), D. Zolezzi (PT)
Patients description	Male, 19 years old, professional youth league U-19 soccer player. At the time of our evaluations (September 2018 – April 2019) the subject was not injured and was recruited in all the matches of the team.
Aim	To improve his overall performance
Sessions	Evaluations were performed at the beginning (T0) and at the end of the treatment (T1). The evaluations included in the perfomance index method were used and the training sessions were planned according to its suggestions. Robotic training: Ten - 1 hour weekly sessions. Training was focused on the 2 functional areas which resulted inferior in performance respect to the rest of the team: Core and ankle ROM.
Results	The overall performance index score improved from 61% to 76%. The two trained functional areas reached the average range of performance of the entire team.
Conclusions	The athlete performed very well during the season and he never got injured. We believe it's very important to evaluate performance during the season in order control each athlete's physical status compared to the team and prevent injuries. The performance index is an easy and valid instrument to use in all sports for all type of athletes.

HUNOVA FOR EVALUATION AND TREATMENT OF CHRONIC ANKLE INSTABILITY USING PERFORMANCE INDEX

Name of the center	Sport and anatomy – Università di Pisa
Description of the center	Sport and Anatomy is a rehabilitation outpatient center. It is located in Pisa. The center provides different rehabilitation services. hunova is used to treat neurological and orthopedic patients.
Authors	G. Risicato (PT), C. Puntoni (PT), S. Dell'Agli (PT), M. Gesi (PhD)
Patients description	24 years old professional basketball player affected by chronic ankle instability.
Aim	To improve balance
Sessions	Evaluations were performed at the beginning (T0) and at the end of the treatment (T1). The evaluations included in the perfomance index method were used and the training sessions were planned according to its suggestions. Robotic training: Eight - 1 hour sessions, twice a week. Training was focused on the 2 functional areas which resulted inferior in performance respect to the best performers: ankle ROM and one-leg stance.
Results	The overall performance index score improved from 57% to 74%. The two trained functional areas reached the average range of performance. In addition, the FAAM score improved: landing from a jump and rapid lateral shifts movements are now performed without difficulty nor pain.
Conclusions	The athlete performed much better during the season, and he felt more confident on relying on the right ankle while playing basketball. We are very happy about the performance index because it helps us to identify functional deficits that affect physical performance. After the identification, this instrument gives us also the training solutions.

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