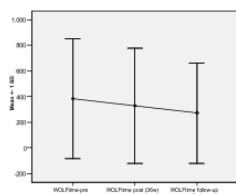


INRS Poster / Speaker Sessions

Upper limb rehabilitation in hemiparetic subjects with the Armeo System
C. Colomer, S. Torromé, A. Baldoví, L. Pérez, P. Morera, C. Mascaros, I. Verdecho, J. Cases, B. Moliner, J.Ferri, E. Noé



- Upper limb rehabilitation program using Armeo
- 28 hemiparetic patients after a brain injury
- 36 sessions of 45-minutes
- Initial, final and a 4-month follow-up assessment
- Significant improvement in upper limb-function

Poster Session - B30

The use of virtual task parameter scaling and robotically simulated global forces to shape motor adaptations in persons with mild to moderate hemiparesis.

G.G. Fluet, Q. Qiu, I. Lafond, S. Saleh, Alma S. Merians, S.V. Adamovich



- The provision of robotic assistive forces changes a task.
- Hammer Task is a robotic activity with no assistive forces.
- Weakness is accommodated with haptic anti-gravity.
- Work-spaces are scaled to match user to abilities.
- User to avatar movement ratio is scaled

Poster Session - B31

Modular Arm Orthosis with Weight Support: Mechanical Concept

W. Reichenfelser, J. Karner, M. Gföhler



- Four electronically lockable degrees of freedom
- Modular device, assembled according to users needs
- Worn with a body harness or mounted on wheelchair
- Weight compensation via a spring mechanics
- Easily adjustable to different anthropologic sizes

Poster Session - B32

Reorganization of spinal neuronal networks after locomotor training in human spinal cord injury

Nupur Hajela, Andrew C. Smith, Chaithanya K. Mummidisetty, W. Zev Rymer, and Maria Nikou



- Lokomat training (LT) in chronic complete SCI
- Electrophysiological tests before and after LT
- After LT, homosynaptic depression returned
- After LT, the soleus H-reflex was modulated
- Evidence support selective spinal plasticity

Poster Session - B33

Generalization of training-induced relaxation of muscular dystonia across tasks in patients with writer's cramp

Kathrin Allgöwer, Waltraud Fürholzer, Barbara Baur, Joachim Hermsdörfer

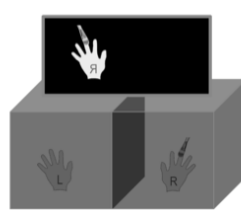


- Investigating grip force in writer's cramp
- Measurement of hand writing with a graphic tablet
- Measurement of forces during weight lifting
- Implementation of a handwriting training
- Success of training extends to other motor skills

Poster Session - B34

Referred Sensations elicited by video-mediated mirroring of hands

Simon Hoermann, Holger Regenbrecht, Liz Franz, Brian Dixon

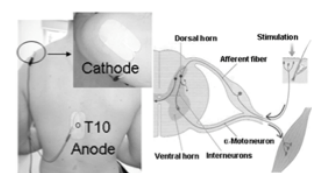


- Replication of referred sensation effects
- Video-mediation for more control e.g. environment
- By stimulating and visually mediating right hand
- Sensations were elicited in the left hand
- Therapeutic potential for pain management etc.

Poster Session - B35

Modulation of spinal neuronal circuitries by transcutaneous spinal direct current stimulation

Michèle Hubli, Miriam Altermatt and Marc Bolliger



- Non-invasive technique for spinal neuromodulation
- Modulation of spinal reflex circuits
- Assessments in healthy and SCI subjects
- Increase in spinal excitability in SCI subjects
- Potential for neurorehabilitation after SCI?

Poster Session - B36

Coordinative training in degenerative cerebellar disease

W. Ilg, D. Brötz, S. Burkard, M.A. Giese, L. Schöls, M. Synofzik



- Intensive coordination training for 4 weeks
- Focus on whole body coordination tasks
- Improvements in ataxia and dynamic balance
- Transfer to ADL
- Continuous training is crucial

Poster Session - B37

INRS Poster / Speaker Sessions

Bimanual coordination in stroke recovery: Kinematic analysis provides open leads to individualize upper limb rehabilitation

J. Metrot, D. Mottet, I. Relave, H.-Y. Bonnin, J.-Y. Pelissier, L. Van Dokkum, K. Torre and I. Laffont



- Natural evolution of bimanual coordination
- Measure upper limb motor capabilities of patients
- Seven reaching kinematics using 3D motion capture
- Initial study with 15 subacute stroke patients

Poster Session - B38

Effectiveness of Robot-Assisted Gait Training in Children with Cerebral Palsy – Preliminary Results

Corinne Ammann-Reiffer, Andreas Meyer-Heim and Hubertus van Hedel



- Randomised clinical cross-over trial
- Effect of Lokomat therapy in children with CP
- 15 outpatient training sessions within 5 weeks
- Various functional gait parameters analysed
- No difference between training & control period

Poster Session - B42

The Effect of Aquatic Exercise on Cardiovascular Fitness in Subacute Stroke Patients

Bo Ryun Kim, M.D., Eun Young Han, M.D., and Sang Hee Im, M.D.



- 6 wks aquatic exercise using a water-based treadmill
- Symptom-limited graded exercise stress test
- 6 exercise stress test and 6MWT parameters analyzed
- Fourteen subacute stroke patients
- Analyzed parameters indicate cardiac function

Poster Session - B45

Effective Rehabilitation of Patients with Motor Disorders

Bodrova R.A.

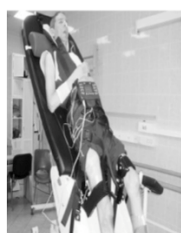


- Assessment of ischemic stroke and paresis
- Combination of kinesiology, sling-therapy, CPM-therapy,
- active mechanic on “Minitensor” and “EN-TreeM”, TENS
- Estimation of EMG and functional parameters
- Analyzed points are indicative of impairment

Poster Session - B46

Combined application of robot-assisted training and functional electrical stimulation in patients with acute stroke

V. Daminov, A. Kuznetsov, N.Rybalko



- Effectiveness of FES and Erigo training
- Monitoring of central and cerebral blood flow
- Combination of both treatments leads to better motor function
- FES and Erigo reduces risk of orthostatic reactions but does not improve cerebral circulation

Poster Session - B49

The Lokomat® effectiveness for the gait rehabilitation in the chronic stage after stroke

A. Castrillo Calvillo, C. López Pascua, M^a Angeles Atin Arratibel, M. Benito García, B.Ruiz Vega, M. Presa Fernández, A. Vicario Méndez, et al.



- Assessment of gait rehabilitation in stroke patients
- Lokomat and therapy based on the Bobath Concept
- 7 kinematic and kinetic parameters were analyzed
- Pilot study with unilateral stroke patients
- Parameters were translated into ICF language

Poster Session - B50

A practical guide for the use of the Lokomat in Children with cerebral palsy

E. Zak, J. Durmala



- The aim of the research is to present a unique monograph
- Analytical methodology of Lokomat training in the rehabilitation of children
- Step by step approach on how to conduct exercises starting from first setup to advanced forms of exercises

Poster Session - B52

INRS Poster / Speaker Sessions

Robotic Training and Kinematic Assessment of Arm and Hand after Incomplete Spinal Cord Injury: A Case Report

Z. Kadivar, J.L. Sullivan, D.P. Eng, A.U. Pehlivan, M.K. O'Malley, G.E. Francisco, N. Yozbatiran

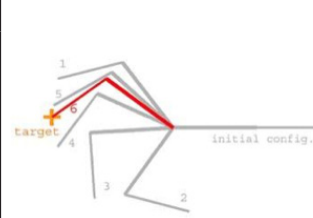


- Robot-assisted training of forearm and wrist
- Suitable for persons with spinal cord injury (SCI)
- Operating modes: passive, active-constraint & triggered
- Tested for a tetraplegic person with SCI
- Kinematic improvements after 10 training sessions

Poster Session - C1

Reliable Strategy for Movement Learning and Control Optimisation

Petko Kiriakov

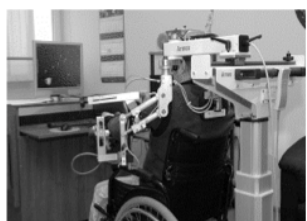


- control learning in goal-directed motion tasks
- new concepts for efficient learning control
- minimum number of control parameters to be learnt
- minimum number of test movements
- reliable control strategy in neurorehabilitation

Poster Session - C3

Cardiovascular response at LOKOMAT-training in spinal cord injured patients

Marina Makarova, Tatyana Shapovalenko, Konstantin Lyadov, Moscow, Russia



- Complex programs arm spasticity
- Combined botuline and kinesiotherapeutic treatment
- Stroke 3 groups moderate expressed spasticity
- Methods MAS ARAT FIM; BT kinesiotherapy ARMEO
- Differentiated program of antispastic treatment

Poster Session - C5

Assessment of swallowing and its disorders – A dynamic MRI study

Vijay Kumar. K.V., Shankar. V., and Roy Santosham



- Dynamic MRI helps better to understand the physiology of swallowing
- This information helps modifying traditional maneuvers to overcome dysphagia
- It provide precise information about swallowing

Poster Session - C6

Cardiovascular response at LOKOMAT-training in spinal cord injured patients

Marina Makarova, Tatyana Shapovalenko, Konstantin Lyadov, Moscow, Russia



- 2 weeks Lokomat training in 57 chronic SCI patients
- Cardiovascular reactions were analyzed
- No circulatory disturbances during walking.
- Increase in diastolic blood pressure & cardiac output
- Decrease in peripheral resistance index

Poster Session - C7

Rehabilitation of post-stroke patients with BCI training

Alexander Frolov, Ludmila Chernikova, Pavel Bobrov and Olesya Mokienko



- Using the BCI based on Bayesian classifier
- Evaluation of the motor imagery performance
- Healthy subjects older 45 are able to Operate BCI
- BCI in rehabilitation of post-stroke patients

Poster Session - C8

New stance control orthotic knee joint for patients with anterior instability of the knee

A. Norouzi-Javidan, S.h. Emami-Razavi, M.Omidzohour, R.Emadifard

- Mechanical weight activated joint for patients with anterior knee instability.
- During weight support phase locked joint supports the knee from instability in the stance phase
- During swing phase the unlocked joint facilitates knee flexion

Poster Session - C10

New Pneumatic and Anti spastic Upper Limb Splint for CVA

S.h. Emami-Razavi, A. Norouzi-Javidan, M.Omidzohour, R.Emadifard



- Create anti-spastic and corrective positions in fingers / wrist and elbow
- Simultaneously prevent subluxation of the shoulder
- Very lightweight
- Easy to wear
- Cost effective

Poster Session - C11

INRS Poster / Speaker Sessions

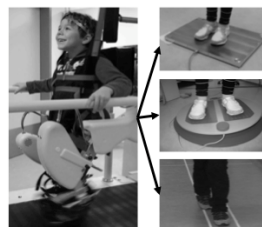
Central and cerebral blood flow estimation of patients in acute stroke applying robotic devices Erigo and Lokomat
V. Daminov, A. Kuznetsov, N. Rybalko



- Cerebral blood flow in acute stroke patients
- Transcranial Doppler ultrasonography of damaged middle cerebral artery
- Application of both devices is safe
- Inclusion of robotic devices has positive effects on cerebral circulation

Poster Session - C12

Immediate Effects of a single Robotic Assisted Gait Training on Balance Skills in Children with Cerebral Palsy
Tabea Schuler, Esther Keller, Roland Müller and Andreas Meyer-Heim



- Effect of a single Lokomat® training:
- Outcome: (I) centre of pressure, (II) gait test
- (II) sensor motor abilities, symmetry, stability
- 7 Children with CP (mean age 13 years, GMFCS level I-III)
- Significant improved static balance and dynamic balance

Poster Session - C13

Application of robot device "Locomat" combined with epidural stimulation at patients with neglected vertebral and spinal trauma
E. N. Shchurova, O. G. Prudnikova, D. N. Blyudenov



- Rehabilitation of patients with spinal trauma
- Virtual reality and epidural stimulation
- Analysis of temperature and pain sensitivity
- Analysis of muscle function
- Interventions improve patients functional status

Poster Session - C14

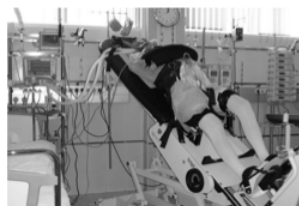
Experience in application of «Amadeo» for the rehabilitation of patients with hemiparesis of different etiology
Sidyakina I., Ivanov V., Shapovalenko T., Lyadov K.



- Amadeo therapy in patients with distal upper limb pareses.
- 26 patients with various neurological pathologies.
- Training led to arbitrary activity in distal muscles
- Inclusion of «Amadeo» therapy in a complex treatment intensifies the rehabilitation program

Poster Session - C16

Early rehabilitation of patients with severe stroke
Sidyakina I., Shapovalenko T., Ivanov V., Lyadov K.



- Rehabilitation program starting 24 hours after stroke
- 258 patients (65,4+13,8 years) were included
- Significant decrease of stroke severity (NIHSS)
- Increased level of functional independence
- Safe & effective rehabilitation is possible at this stage

Poster Session - C17

Rehabilitation vision by means of influencing vibration on mimic muscle and biological active points
Skuratovich A.S.



- Myopia is caused by excessive strain eye muscles.
- It is necessary to design special exercises
- Rehabilitation including muscle stimulation
- Stimulate biological active points
- gain of visual acuity was in the range of 1.2 to 2.1.

Poster Session - C18

Device for rehabilitation of hand and finger mobility
Skuratovich A.S.



- Hand injuries compose 23%--32%
- develop the device
- develop methods and exercises of rehabilitation
- To reduce rehabilitation time
- develop methods of complex-coordination movements

Poster Session - C19

Evaluation of robot-assisted gait rehabilitation using integrated biofeedback in neurologic disorders
Oliver Stoller, Marco Waser, Lukas Stammler and Corina Schuster



- Clinical evaluation of 8 robot-assisted training sessions
- Using an existing biofeedback system
- Sign. differences in hip flexion and knee extension activities
- Biofeedback system is not appropriate to evaluate progress

Poster Session - C20

INRS Poster / Speaker Sessions

Changes of somatosensory sensibility of amputees by multi-channel vibration stimulator

Tae Soo Bae, Hyung Jae Kim, Jong Kwon Kim, Sol Bi Kim, Yun Hee Chang, Shin Ki Kim, and Mu Seong Mun

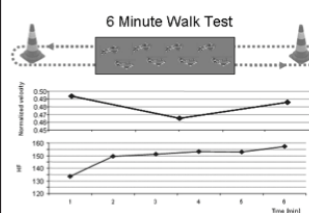


- Assessment of somatosensory sensibility at stump
- Setup of multichannel vibraton stimulation system
- Subjective response for random stimulus analyzed
- Clinical research with amputee and non-amputee
- No difference of response at most of channels

Poster Session - C21

Stability of walking performance during the 6-minute walk test: Preliminary results in young patients with neurological disorders

Huub van Hedel and Monika Leuenberger



- 20 children with neurological gait-disorders
- stepped during 6MinWT repeatedly over GaitRite
- during the test: increase in heart frequency
- changes in velocity, step length and asymmetry
- performance during 6 MinWT is not constant

Poster Session - C22

Quantifying dexterity and grasping in children with cerebral palsy: Validity and reliability of the nine-hole-peg test and box-and-block test

Huub van Hedel and Karin Wick



- 25 children with cerebral palsy participated
- Dynamometry, BBT and NHPT repeatedly performed
- More affected side: $0.92 \leq ICC \leq 0.97$
- Reliability improves by using average/best value
- These tests are reliable in children with CP

Poster Session - C23

Mixed Reality to Strengthen Early Post Stroke Upper-Limb Rehabilitation

Liesjet Van Dokkum, Ines di Loreto, Isabelle Laffont & Abdelkader Gouaich



- Mixed Reality to improve upper-limb rehabilitation
- Real life hand movements within a virtual environment
- Enhancing motivation & fun
- Increasing quantity & quality of training
- Stroke experts ++ on utility, usefulness and clinical potential.

Poster Session - C25

Robotic training and clinical assessment of upper limb movements after incomplete spinal cord injury: two case reports

Yozbatiran N, Berliner J, O'Malley M.K, Pehlivan A.U, Kadivar Z, Boake C, Francisco G.E



- Robotic-assisted training of upper limb motor functions after SCI
- 10-12 sessions of treatment
- Clinical and functional assessment
- No adverse events
- Improvement in arm and hand functions

Poster Session - C26

A comprehensive assessment of motor function after 4 weeks of treatment of gait

E. Zak, J. Durmala, G. Sobota, A. Glowacka, A. Czernuszenko, M. Bonikowski, S. Snela



- Multicenter project conducted over a period of one year
- Dynamics of functional motor abilities of children with CP applying robotic as well as conventional therapy
- Pre-, and post training evaluation (GMFM-88, 6MWT, 10MWT, TUG, motion analysis)

Poster Session - C27

What kind of exercises can be led during gait therapy on a treadmill?

E. Zak, J. Durmala



- Gait is a set of controlled activities coordinated by movements of upper limb and trunk
- Effectiveness of rehabilitation depends on motivation, age, muscle strength and exercise
- We present exercises that can be used during Lokomat therapy in children

Poster Session - C28

A practical guide for the use of the Lokomat in Children with cerebral palsy

E. Zak, J. Durmala




- The aim of the research is to present a unique monograph
- Analytical methodology of Lokomat training in the rehabilitation of children
- Step by step approach on how to conduct exercises starting from first setup to advanced forms of exercises

Poster Session - C29

Speaker Session


Measuring and Augmenting Locomotor Recovery after SCI with Spinal Cord Stimulation
Keith Tansey



- Reflexes track plasticity of locomotor recovery
- Spinal stimulation causes reflexes in leg muscles
- The Lokomat can trigger spinal stimulation in gait
- More loading and treadmill speed improves stepping
- This is augmented with tonic spinal stimulation

Paper 1


fNIRS monitoring of neurorehabilitation
Ichiro Miyai



- Functional NIRS is used to feed back cortical activation related to aimed movements before, during and after rehabilitation intervention.
- Knowledge of results and reward regarding performance may enhance efficacy of motor learning

Paper 2


Practical Considerations in Formulating Stroke Rehabilitation Clinical Trials
Steven Wolf



- Contemporary obstacles to implementing rehabilitation clinical trials
- Specifying generalizability of approaches
- Health care policies – hindrance or facilitator?
- The intellectual cost of financial cost constraints

Paper 3


Biomimetic Upper Limb NMES Integrated with Eye Tracking in Hybrid Assistive Exoskeletons
Ferrigno G., Ferrante S., Ambrosini E., Casellato C., Gandolla M., Pedrocchi A.



- Identification of interaction tasks shared into sub-actions
- Identification of motor strategies during reaching supported by ArmeoSpring™
- Definition of a NMES biomimetic feedforward controller
- Use of the Eye tracking to detect user intention
- Initial study on healthy volunteers

Paper 4


Clinical use of Rehabilitation Robotics: Getting to best practices
Michael Boninger



- Is Standardization Best Practice?
- Standardizing Robotics Protocols
- Getting to Uniform Data Collection
- Techniques to Get to Consensus

Paper 5

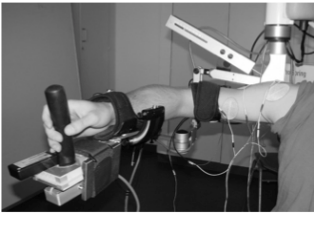
Strategies for Neuromuscular Recovery after Spinal Cord Injury
Susan Harkema



- Improvements of balance and ambulation in individuals with chronic spinal cord injury using locomotor training.
- Analyses of outcome measures for neurologic recovery
- New approaches for recovery with epidural stimulation

Paper 6


EMG-controlled functional electrical stimulation: devices and methods
Thomas Schauer



- EMG-based detection of muscle activity during FES
- Measurement from stimulation- or EMG-electrodes
- Filters for assessing volitional muscle activity
- EMG-driven FES: Triggered versus proportional
- Applications: Upper limb control & FES cycling

Paper 7

Robotic technologies for multiple sclerosis
Vittorio Sanguinetti



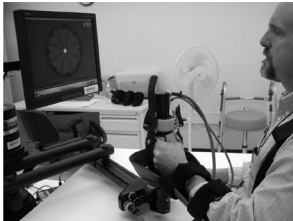
- Rehabilitation in multiple sclerosis: what use for robots?
- Using robots to assess impairment, adaptation, capabilities.
- Using robots for therapy:
- Reorganization, compensation, attention
- Personalization of exercise
- Adaptive training
- Motor skill learning

Paper 8

INRS Poster / Speaker Sessions

Clinical Evidence for Upper-Extremity Rehabilitation in Chronic Stroke and Implications for Use of Robotic Technology: Results of VA ROBOTIC Clinical Trial

Albert Lo



- Robot vs usual care significant at 36 wks not 12
- Robot vs conventional improvement is not different
- Subjects were more severe with multiple strokes
- Results suggest latent motor plasticity potential
- Overall health cost for rehabilitation robots

Paper 9