Nutzen Sie Ihre Behinderung, um innovative Lösungen zu entwickeln!

Sebastian Tobler
Lecturer for Vehicle Construction at Bern University of Applied Sciences & CEO of GBY SA

BFH-researchXchange, 26.11.2021
Spinal cord injury: implications...
Sport vs Health
«Biomechanics»
Biomechanics
Genesis of the Go-Tryke
Genesis of the Go-Tryke
Publications

Shaping Appropriate Locomotive Motor Output Through Interlimb Neural Pathway Within Spinal Cord in Humans

Noritaka Kawashima, Daichi Nozaki, Masaki O. Abe and Kimitaka Nakazawa

1Department of Rehabilitation for the Movement Functions, Research Institute of the National Rehabilitation Center for Persons with Disabilities, Tokorozawa; 2Japanese Society for the Promotion of Science; 3Department of Physical and Health Education, Graduate School of Education, University of Tokyo, Tokyo, Japan; 4Lyndhurst Centre, Toronto Rehabilitation Institute, Toronto, Ontario, Canada; and 5Department of Kinesiology, Pennsylvania State University, University Park, Pennsylvania

Submitted 8 January 2008; accepted in final form 16 April 2008
Cervical incomplete (Subj. G.R.)

A Rest

- Hip
- Ankle
- Load
- Sol
- TA
- aDel
- pDel

Thoracic complete (Subj. W.K.)

- Hip
- Ankle
- Load
- Sol
- TA
- aDel
- pDel
Publications

Cervical incomplete (Subj. G.R.)

Thoracic complete (Subj. W.K.)

B Passive

- Hip
- Ankle
- Load
- Sol
- TA
- aDel
- pDel
Publications

- Cervical incomplete (Subj. G.R.)
- Thoracic complete (Subj. W.K.)

Active

- Hip
- Ankle
- Load

Sol TA aDel pDel

1 sec

GBY
GO BY YOURSELF
Publications

Cervical incomplete (Subj. G.R.)

Thoracic complete (Subj. W.K.)

A Rest

B Passive

C Active

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GBY Test

Before
Speed 2x

Sonat
Cerebral Palsy

After
Non-gait-specific intervention for the rehabilitation of walking after SCI: role of the arms

Rui Zhou,1,3 Laura Alvarado,1,3 Robert Ogilvie,2,3 Su Ling Chong,2,3 Oriana Shaw,2,3 and Vivian K. Mushahwar1,2,3

1Neuroscience & Mental Health Institute, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta, Canada; 2Division of Physical Medicine & Rehabilitation, Department of Medicine, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta, Canada; and 3Sensory Motor Adaptive Rehabilitation Technology (SMART) Network, University of Alberta, Edmonton, Alberta, Canada

Submitted 31 July 2017; accepted in final form 23 January 2018
Figure 2.11. Comparisons of the improvement in walking.
No muscle activity?

FES: Functional Electrical Stimulation

EES: Epidural Electrical Stimulation
INTEGRATION OF WIRELESS FUNCTIONAL ELECTRICAL STIMULATION IN A RECUMBENT THERAPY TRIKE

by

Thomas Falk
of Lyss, Bern

Supervisor
Prof. Dr. Kenneth James Hunt

Institution
Institute for Rehabilitation and Performance Technology
Department of Engineering and Information Technology
Bern University of Applied Sciences

Examiners
Prof. Dr. Kenneth James Hunt and MSc Manuel Bracher

Burgdorf, May 2016

Figure 28: Wireless FES cycling sensor setup. Emergency stop, throttle, torque sensor, encoder and inductive proximity sensor mounted on the trike.
Stimo

A Epidural spinal cord stimulation & robotic interface

16-elements electrode array

Implantable stimulator

B Closed-loop spatio-temporal neuromodulation

Stimulation pattern

FLEXION
EXTENSION

stance swing

Neuro Restore

FBH

Bern University of Applied Sciences

GBY

GO BY YOURSELF
Master Project in Life Sciences Engineering

Assisted Cycling with Force-Driven Closed-Loop Epidural Electrical Stimulation in Clinical and Ecological Settings for Rehabilitation after Spinal Cord Injury

Margaux Roulet

Presented on August 31, 2021

Under the supervision of
Dr. Léonie Asboth, Sebastian Tobler and Nicolas Hankov

Under the direction of
Prof. Grégoire Courtine and Prof. Jocelyne Bloch
iEES Go-Tryke Force

Working Principle

Arm Force
40 N

Resistance to motion

Delivered Stimulation

Duffell et al. | Frontiers in Neurology | 2020
Ferris et al. | Exercise and Sport Sciences Reviews | 2005
Courtine & Bloch | Neuron | 2015
Target knee extension during push phase

Cycling with and without EES
Effects of EES on Legs Tangential Force

EES of knee extension generates effective legs force to the cycling task
To summarise:

- Exploring your disability
- Understanding your disability
- Making the most of your disability
- Working with specialists
- Connecting specialists
- Launching studies
- Developing solutions
A production of SCI-Mobility
Season 2020-2021
A BFH laboratory
Measure
Analyze
Innovate
sci-mobility@bfh.ch

Inauguration
24.03.2022
Thank you !!!

Sebastian Tobler
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Head of the SCI-Mobility Lab at BFH-TI, 2501 Bienne

CEO at GBY SA, 1696 Vuisternens-en-Ogoz

Generator of projects and studies with
BFH-TI Bienne, BFH-TI Burgdorf, UNIL, Neurorestore (EPFL/CHUV), SPF

Patient for studies
Neurorestore (EPFL/CHUV), UNIL, SPF

Interested in working on a project with us?