



Berner  
Fachhochschule

Zürcher Hochschule  
für Angewandte Wissenschaften



Abstracts 2020

# Masterarbeiten Master of Science in Physiotherapie (MScPT) Studiengang 2017



# Editorial

Sehr geehrte Leserin, sehr geehrter Leser

Mittlerweile ist es Tradition, dass Sie im Herbst den Abstractband der Masterarbeiten des Studiengangs Master of Science in Physiotherapie (MScPT) erhalten. In diesem Jahr den Abstractband der Absolvierenden, die im Jahr 2017 ins Studium gestartet sind.

Die Corona-Pandemie hat uns alle vor grosse Herausforderungen gestellt. Ganz besonders gilt das auch für unsere Master-Studierenden, die für ihre Masterarbeit trotz Lockdown und unter zum Teil schwierigen Umständen innovative Lösungen finden mussten, um rechtzeitig und in der vorgesehenen Qualität abschliessen zu können.

Wie immer – und dieses Mal besonders – sind wir stolz auf unsere Absolvierenden! Wir schätzen ihre Motivation und ihr Engagement im Studium, sind beeindruckt von den steilen Lern- und Entwicklungsprozessen, die sie in den vergangenen drei Jahren gemacht haben, und freuen uns nun über ihre methodisch vielfältigen, spannenden und sorgfältigen Masterarbeiten. Unsere Freude verbinden wir mit einem grossen Dank an unsere Dozierenden und Betreuenden, die all das ermöglicht haben.

Für viele dieser Physiotherapeutinnen MSc und Physiotherapeuten MSc wird dieser Abschluss wiederum ein neuer Anfang sein. Viele erweitern ihre Tätigkeitsfelder oder es stehen ihnen die Türen offen für neue Jobs und Aufgaben.

Für einige wird der MSc früher oder später zur Grundlage eines Doktorats an einer in- oder ausländischen Universität. Auch dafür gibt es bereits zahlreiche Vorbilder aus den früheren MScPT Studiengängen.

Den MScPT Absolvierenden gratulieren wir herzlich zu ihren gelungenen Masterarbeiten und zu ihrem Abschluss!

Ihnen wünschen wir eine interessante Lektüre!



Prof. Dr. Karin Niedermann  
Leiterin Studiengang  
MSc in Physiotherapie (ZHAW)



Prof. Dr. Amir Tal  
Leiter Studiengang  
MSc in Physiotherapie (BFH)

# Masterarbeiten (Abstracts)

Factors Influencing the Return to Competition Decision After Anterior Cruciate Ligament Reconstruction Sibylle Achermann	8
Machbarkeitsstudie: Virtual Walking bei Personen mit neuropathischen Schmerzen infolge Querschnittlähmung Marina Aerni	9
The Effect of Foot Progression Angle on the Knee Adduction Moment and the Muscle Activity of the Lower Extremity A Cross Sectional Study During Stair Climbing in Healthy Adults Anja Beugger	10
Durchführbarkeit eines Eigentrainings mit einem sensorbasierten Gerät mit Augmented Feedback – eine Machbarkeitsstudie Manuela Bischofberger	11
Effect of Short-Term Oxygen Therapy on Exercise Performance in Patients With Pulmonary Hypertension Associated to Cyanotic Congenital Heart Disease – a Randomized, Sham-Controlled Cross-Over Trial Luigi-Riccardo Calendo	12
A Construct Validity Study of JINS MEME Smart Eyeglasses to Detect Eye Movements and Evaluate Motor Imagery Ability in Patients After Stroke Letizia Cappelletti	13
12 Weeks High Intensity Interval Training Versus Moderate Intensity Continuous Training in Chronic Low Back Pain Subjects: A Randomised Single-Blinded Feasibility Study. Tamara Cerini	14
Comparison of Two Commercially Available Devices to Measure Nitric Oxide Lung Diffusing Capacity in Healthy, Non-Smoking Adults, a Randomized Cross-Over Study Quintin de Groot	15
A Powered Ankle Foot Orthosis Based on Shaft Twisted String Actuation to Assist Persons With Foot-Drop: A Feasibility Study Pedrin Denoth	16
Start Back Tool Risk Classification Two Months After Onset of Low Back Pain Can Distinguish Between Mild and Moderate Future Pain in the Short Term – a Prospective One-Year Cohort Study Dominik Gross	17
Knee Joint Load During Stair Climbing The Effect of an Externally or Internally Rotated Foot Progression Angle During Stair Climbing on the Knee Adduction Moment and the Knee Adduction Impulse Simone Hänni	18

The Implementation of a Standardised Programme for the Conservative Management of Knee and Hip Osteoarthritis in Switzerland: A Cross-Sectional Survey <u>Anja Hinteregger</u>	19
Return to Sport After Anterior Cruciate Ligament Rupture – Validation Study of the Test Protocol of a Swiss Regional Hospital <u>Sabrina Imhof</u>	20
Development of a Functional Test Battery for Patients With Patellofemoral Pain. An International and Inter-professional Delphi Study <u>Samuel Kälin</u>	21
Diagnostic and Decision-Making Ability of Swiss Physiotherapists in 2019 – Results of a Questionnaire With Clinical Case Scenarios in a Direct Access Setting <u>Fabienne Keller</u>	22
Usability Evaluation einer Smartphone Applikation für Heimübungen in der Physiotherapie – eine Querschnittsstudie <u>Annelie Klaus</u>	23
Erkennung von Augenbewegungen während Bewegungsausführung und Bewegungsvorstellung bei Patienten nach Schlaganfall mit der JINS MEME Brille: eine Test-Retest-Reliabilitätsstudie <u>Annika Krug</u>	24
Der Effekt einer bimaxillären Okklusionsschiene (dynamisches Zahnschienensystem Stressbite®), auf die posturale Kontrolle und das Gleichgewicht, bei Patienten mit Bruxismus <u>Marc Kwidzinski</u>	25
Impact of Combined Action Observation and Motor Imagery on Lower Limb Reflex Behavior After Stroke Compared to Age-Matched Healthy Controls A Cross-Sectional Study <u>Monika Le-Minh</u>	26
Clinical Assessments Can Discriminate Altered Body Perception in Patients With Unilateral Chronic Low Back Pain, but Not Differences Between Affected and Unaffected Side <u>Raphael Michael Meier</u>	27
Praktikable Verlaufsmessinstrumente bei Hüftarthrose, Femoroazetabulärem Impingement und dem Greater Trochanteric Pain Syndrom – eine Literaturübersicht <u>Miriam Molter</u>	28

Prediction and Trend of Tactile Acuity, Pain and Disability in Acute LBP: A Six-Month Prospective Cohort Study Rita Morf	29
First Assessment of a Cost Questionnaire for Its Agreement With Administrative Databases in Females With Stress Urinary Incontinence in Switzerland: A Validation Study Céline Mötteli	30
Effect of Short-Term Oxygen Therapy on Exercise Performance in Pulmonary Hypertension Due to Heart Failure With Preserved Ejection Fraction – a Randomized Placebo-Controlled Trial Julian Müller	31
Bewegungsanalyse des Gangbildes beim Tragen von Achillessehnen Spezialschuhen – ein deskriptiver Vergleich von Patienten nach Achillessehnenverletzung und gesunden Probanden Cristina Raaflaub	32
Praktikable Verlaufsmessinstrumente für Meniskusläsion, Kniearthrose und vordere Kreuzbandverletzung – eine Literaturübersicht Tamara Rechenmacher	33
The Impact of Walking Behind the Patient on Six-Minute Walk Test Distance in COPD: A Randomised Cross-Over Study Thomas Riegler	34
Loosing While Winning – How to Keep Lean Mass During Weight Loss. A Systematic Review and Meta-Analysis. Anja Marina Roth	35
Deutsche Übersetzung und Validierung der Exercise Self-Efficacy Scale für körperliche Aktivität bei Ankylosierende Spondylitis-Betroffenen Riana Saba	36
Robotic-Mediated Therapy for Chronic Rotator Cuff Tears Associated With Pseudoparalysis or Pseudoparesis Proofs Feasible With Positive Trend: A Feasibility Study Sabine Schibli	37
The Predictive Values of Early Depression, Anxiety, Stress, the Timeline, Low Self-Control and Help-/ Hopelessness on the Course of Low Back Pain in Primary Care and the General Population: A One-Year Prospective Cohort Study Martina Steger	38
Praktikable Verlaufsmessinstrumente für Sprunggelenksdistorsion, Achillesschneidmuskel- und Sprunggelenksfraktur – eine Literaturübersicht Andrea Stehrenberger	39

Feasibility and Preliminary Efficacy Testing of an Exosuit for Patients With Unilateral Gait Impairments <u>Jasper van Steenhoven</u>	40
Analyse von Kommunikations- und Verhaltensänderungstechniken von Physiotherapeuten/-innen während der Bewegungsberatung mit Morbus-Bechterew-Betroffenen <u>Ulisse Patrizio Vogt</u>	41
Contribution of 1a Afferent Fibers to Motor Control During Walking Under Different Body Mass Conditions <u>Christina Wettengl</u>	42

## Sibylle Achermann

Bern University of Applied Sciences, Department of Health Professions,  
Bern

### Co-Autorinnen/Co-Autoren

Heiner Baur, PhD<sup>1</sup>

Julia Marty, MSc<sup>2</sup>

Andreas Beck, MD<sup>2</sup>

Bertram Rieger, MD<sup>2</sup>

Anja Hirschmüller, MD<sup>2</sup>

<sup>1</sup>Bern University of Applied Sciences, Department of Health Professions, Bern

<sup>2</sup>ALTIUS Swiss Sportmed Center, Rheinfelden

# Factors Influencing the Return to Competition Decision After Anterior Cruciate Ligament Reconstruction

**Background:** It is unknown, which valid criteria should be considered to justify the decision for return to competition (RTC) following anterior cruciate ligament reconstruction (ACLR). The research question is, whether gender, age, the outcome of the isokinetic maximal strength measurement and the single-leg hop test (quantitative/qualitative) influence the decision for RTC nine months after ACLR.

**Methods:** The present study is a retrospective data analysis. The research question was analyzed with a multiple logistic regression analysis (MLR). The dependent variable, RTC yes/no, is based on the decision of the orthopedic in charge nine months ( $\pm 30$  days) after ACLR. The following possibly influencing factors were investigated: gender, age, limb symmetry index (LSI) of maximal knee extension and knee flexion strength at 60°/sec., LSI of the single-leg hop test and the evaluation of knee valgus.

**Results:** Data of 71 patients were included for MLR. The odds ratios (OR) for RTC increased with female gender (OR, 4.808;  $p=0.035$ ), a higher LSI of maximal strength of knee extension (OR, 1.117;  $p=0.009$ ) and a higher LSI of the single-leg hop test (OR, 1.125;  $p=0.020$ ). Age, the LSI of maximal strength of knee flexion and knee valgus had no influence on the RTC-decision.

**Conclusion:** Gender and the limb symmetry indexes of the maximal strength of knee extension and of the single-leg hop test are associated with RTC nine months after ACLR. These results should be considered to optimize rehabilitation after ACLR.

### Betreuungsperson

Heiner Baur, PhD



# Machbarkeitsstudie: Virtual Walking bei Personen mit neuropathischen Schmerzen infolge Querschnittlähmung

**Hintergrund/Ziele:** Querschnittgelähmte Personen haben oft starke neuropathische Schmerzen. Dennoch gibt es bisher noch keine evidenzbasierte Behandlungsoptionen. Das Zentrum für Schmerzmedizin in Nottwil hat eine Intervention namens virtual walking entwickelt, bei der sich querschnittgelähmte Personen auf einer Leinwand vor sich gehen sehen. Das Ziel der vorliegenden Studie war die Machbarkeit, das heisst die Zufriedenheit, Akzeptanz und Adhärenz des Teilnehmenden bei der Durchführung der Intervention zu untersuchen und Hinweise zu erhalten, um die Behandlung zu optimieren.

**Methode:** Bei dieser Masterarbeit handelt es sich um eine Machbarkeitsstudie. Die Intervention wurde in zwei unterschiedlichen Settings an vier querschnittgelähmten Teilnehmenden durchgeführt. Die Erhebung der Zufriedenheit, Akzeptanz und Adhärenz erfolgte mittels eines Evaluationsfragebogens und Interviews. Weiter wurden Schmerzintensität, Schmerzausbreitung und Schmerzqualität gemessen. Alle Outcomes wurden deskriptiv analysiert. Die Interviews wurden transkribiert und mit einer qualitativen Inhaltsanalyse ausgewertet.

**Resultate:** Die Ergebnisse zeigen eine gute Zufriedenheit und Akzeptanz der Teilnehmenden. Die Mediane zur Zufriedenheit, Weiterführen, Betreuung, Dauer und Anzahl der Einheiten lagen alle über der Schwelle von 60 mm. Einzig beim Thema Echtheit lagen zwei der Mediane darunter. Die Adhärenz betrug 77.5%. Eine Person erreichte klinisch relevante Veränderungen der Schmerzintensität und Schmerzqualität.

**Diskussion/Schlussfolgerung:** Die Resultate zeigen, dass das virtual walking für Personen geeignet ist, welche an neuropathischen Schmerzen als Folge einer Querschnittlähmung leiden. Die Teilnehmenden akzeptierten die Intervention und zeigten sich zufrieden und adhärenz. Bei den Schmerzoutcomes zeigten sich leichte Tendenzen auf eine mögliche Wirkung des virtual walkings auf Schmerzintensität und Schmerzausbreitung, wobei nur eine Person sich in allen drei Aspekten verbessert hatte.

### Co-Autorin/Co-Autoren

Karina Ottiger-Böttger, PT<sup>1</sup>

Markus Barbero, PT, PhD<sup>2</sup>

Markus Ernst, PT, MSc<sup>3</sup>

<sup>1</sup>Zentrum für Schmerzmedizin-  
Nottwil

<sup>2</sup>Scuola universitaria professionale della Svizzera italiana - SUPSI

<sup>3</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW),  
Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

### Betreuungspersonen

Karina Ottiger-Böttger, PT

Markus Ernst, PT, MSc

## Anja Beugger

Bern University of Applied Sciences, Department of Health Professions,  
Bern

### Co-Autorin/Co-Autoren

Heiner Baur, PhD<sup>1</sup>

Simone Hänni, PT, BSc<sup>1</sup>

Roy T.H. Cheung, PT, PhD<sup>2</sup>

Tim S. Wang, PT, MSc<sup>2</sup>

Patric Eichelberger, PhD<sup>1</sup>

<sup>1</sup>Bern University of Applied Sciences, Department of Health Professions, Bern

<sup>2</sup>The Hong Kong Polytechnic University, Department of Rehabilitation Sciences, Gait & Motion Analysis Laboratory, Hong Kong, China

## The Effect of Foot Progression Angle on the Knee Adduction Moment and the Muscle Activity of the Lower Extremity A Cross Sectional Study During Stair Climbing in Healthy Adults

Some studies showed an influence of the foot progression angle (FPA) on the knee adduction moment (KAM). When walking stairs, the influence of FPA and the role of the muscles, is still unclear. This study investigated the influence of externally (eFPA) and internally (iFPA) rotated foot progression angle on KAM and the activity behaviour of the muscles during stair walking. In addition, the intraday- reliability of electromyography (EMG) measurements on the stairs was examined. 24 young, healthy volunteers walked up and down the stairs ten times with each condition. Comparison was made between variations walking up- and downstairs. The reliability was investigated using Interclass Correlations Coefficients (ICC) and Minimal Detectable Changes (MDC). Upstairs, eFPA reduce muscle activity and therefore KAM and iFPA increased muscle activity and KAM. Downstairs, KAM was reduced with iFPA and increased with eFPA, muscular activity has little influence here. On average, there was a moderate to good reliability when climbing (ICC 0.6- 0.8) and descending (ICC 0.7- 0.8). The measurement error was within the range of previous literature when climbing up (MDC 10- 20%) and descending (MDC 10- 15%). With altered FPA and muscle activity, KAM can be reduced while climbing stairs. This is a possible approach to knee joint complaints that should be further investigated.

### Betreuungsperson

Heiner Baur, PhD

# Durchführbarkeit eines Eigentrainings mit einem sensorbasierten Gerät mit Augmented Feedback – eine Machbarkeitsstudie

Co-Autorin/Co-Autoren

Carsten Möller, MD<sup>1</sup>

Alexandra, Menig MSc<sup>1</sup>

Oliver Stoller, PhD<sup>2</sup>

<sup>1</sup>Rehaklinik Zihlschlacht

<sup>2</sup>VAMED

**Hintergrund:** Patient/-innen mit Armparese leiden oft unter starken Einschränkungen der Alltagsfunktionen. Parallel oder sequentiell zur gewöhnlichen Rehabilitation erweist sich ein Eigentaining als sinnvoll, um die Ziele «maximale Funktion und Autonomie» zu erreichen.

**Ziel:** Exemplarisch wurde untersucht, ob der Einsatz eines sensorbasierten Hilfsmittels für die obere Extremität mit augmented Feedback in Eigentherapie selbständig angewendet und die Therapie umgesetzt werden kann und welche Barrieren bei dieser Trainingsform entstehen.

**Methode:** Die vorliegende Studie untersuchte in Form einer Anprobe, inwiefern Patient/-innen mit einer Armparese ein Eigentaining mit dem ArmeoSenso und die zugehörige Installation selbständig durchführen können. Dafür wurden sechs Versuchspersonen (VP) in das Training eingeführt und danach zum zweiwöchigen selbständigen Training aufgefordert. Die Datenerhebung erfolgte mittels gerätebasierten und selbstberichteten Daten, welche Aufschluss über Trainingsfrequenz und -erfolg lieferten. Die Datenanalyse und -darstellung wurde mit Excel erstellt und deskriptiv ausgewertet.

**Resultate:** Die Hälfte der VP (n=6) konnte das Eigentaining praktisch problemlos umsetzen. Zwei VP brachen die Studie nach der Einführung ab, aufgrund der zu hohen Komplexität des Gerätes zur selbständigen Anwendung. Eine VP trainierte die geforderte Zeit, jedoch nur unter Supervision mit Hilfestellung.

**Diskussion/Schlussfolgerung:** Als Barriere für das sensorbasierte Eigentaining stellte insbesondere der Faktor einer fehlenden Supervision durch eine Fachperson dar. Ein weiteres Hindernis zeigte sich in den hohen technologischen Anforderungen an die Trainierenden. Dadurch wurde ein erfolgreiches Training dieser VP verhindert. Die erfolgreiche Gruppe befand die Trainingsform für akzeptabel und anwendbar.

Betreuungsperson

Oliver Stoller, PhD

## Luigi-Riccardo Calendo

Pulmonary Clinic, University Hospital Zurich

### Co-Autorinnen

Silvia Ulrich, MD<sup>1,2</sup>

Stéphanie Saxer, PT, PhD<sup>1</sup>

<sup>1</sup>Pulmonary Clinic, University Hospital Zurich

<sup>2</sup>University of Zurich

# Effect of Short-Term Oxygen Therapy on Exercise Performance in Patients With Pulmonary Hypertension Associated to Cyanotic Congenital Heart Disease – a Randomized, Sham-Controlled Cross-Over Trial

**Aim:** To investigate the effect of short-term oxygen therapy on exercise performance in patients with pulmonary arterial hypertension due to congenital heart disease (PAH-CHD).

**Methods and Results:** 7 PAH-CHD-patients (4 women, median [IQR] age 36 years [32;50], BMI 23 kg/m<sup>2</sup> [20;26], SpO<sub>2</sub> 87 % [83;89]) underwent 4 cycle exercise tests to exhaustion, while breathing either oxygen-enriched (FiO<sub>2</sub> 0.50, hyperoxia) or ambient air (FiO<sub>2</sub> 0.21, normoxia) using incremental (IET) or constant work-rate (CWRET) protocols (with 75% maximal work rate under FiO<sub>2</sub> 0.21) according to a randomized, sham-controlled, single-blind, cross-over design. ECG, pulmonary gas-exchange, arterial blood gases, cerebral and quadriceps muscle tissue oxygenation (CTO and QMTO) by near-infrared spectroscopy were measured. In IET, maximal work-rate increased from 77W (61;114) to 83 (67;136), median difference 9W (0;22) with hyperoxia vs. air (p=0.046) and CWRET duration increased from 412s (325;490) to 468s (415;553) (p=0.018) under hyperoxia median increase 56s (39;126).

**Conclusion:** Patients with PAH due to cyanotic CHD significantly improve their cycling exercise performance under hyperoxia compared to breathing ambient air by increasing both, the work rate during IET and endurance time during CWRET. Patients with PAH-CHD may therefore benefit from oxygen therapy during daily physical activities and training.

**Keywords:** cyanotic CHD, hyperoxia, exercise performance

### Betreuungspersonen

Silvia Ulrich, MD

Stéphanie Saxer, PT, PhD

# A Construct Validity Study of J!NS MEME Smart Eyeglasses to Detect Eye Movements and Evaluate Motor Imagery Ability in Patients After Stroke

**Introduction:** Stroke is a leading cause of death with globally 15 million events per year. One-third out of 15 million stroke cases persist permanently disabled and are no longer able to live independently also after a rehabilitation program.

In the treatment of post-stroke patients, different therapeutic methods are used. One of them is motor imagery (MI). MI is defined as the mental execution of an action without any actual movement. Research found that physical training combined with MI improved performance after stroke. During MI a natural reflective eye movement occurs. A valid mobile measurement device for measuring motor imagery performance by means of eye movements is still missing.

**Research question:** Is the J!NS MEME smart eyeglasses a valid measurement device to detect eye movements compared to conventional EOG in patients after stroke during physical execution and motor imagery?

**Methods:** In a convergent construct validation study the J!NS MEME smart eyeglasses was compared to conventional EMG during an upper and lower extremity task in stroke patients. Previous to the validation study, a technical validation with five healthy volunteers was conducted to ensure the measurement procedure.

**Results:** An adequate cross-correlation of 0.45 (overall mean) with a standard deviation of 0.11 for the upper extremity task was found between the J!NS MEME smart eyeglasses and the conventional EMG of the M. orbicularis oculi. The means of cross correlation under the two different conditions are with 0.46 for physical execution with a standard deviation of 0.13 and 0.45 for motor imagery with a standard deviation of 0.09 are closely related.

**Conclusion:** The convergent construct validity of the J!NS MEME smart eyeglasses could only be checked to the upper extremity task hand grasping. The results of the cross-correlation suggest an adequate correlation between the J!NS MEME smart eyeglasses and the conventional EOG of the M. orbicularis oculi.

Co-Autorinnen/Co-Autor

Corina Schuster-Amft, PT, PhD<sup>1,2,3</sup>

Szabina Gäumann, PT, MSc<sup>1,4</sup>

Anil Aksöz, PhD<sup>1,5</sup>

<sup>1</sup>Reha Rheinfelden, Research Department, Rheinfelden

<sup>2</sup>Bern University of Applied Sciences, Institute for Rehabilitation and Performance, Burgdorf

<sup>3</sup>University of Basel, Department of Sports, Exercise and Health, Basel

<sup>4</sup>Balance – Zentrum für Physiotherapie und Medizinisches Training, Muttenz

<sup>5</sup>Motor Learning and Neurorehabilitation Lab, ARTORG Center for Biomedical Engineering Research, Bern

Betreuungsperson

Corina Schuster-Amft, PT, PhD

Tamara Cerini  
Schulthess Klinik, Zurich

Co-Autoren

Quinten Felsch T. M., MD<sup>1</sup>

Roger Hilfiker, PT, MSc<sup>2</sup>

<sup>1</sup>Schulthess Klinik, Zurich

<sup>2</sup>School of Health Sciences,  
HES-SO Valais-Wallis, Sion

## 12 Weeks High Intensity Interval Training Versus Moderate Intensity Continuous Training in Chronic Low Back Pain Subjects: A Randomised Single-Blinded Feasibility Study.

**Question(s):** Has high intensity interval training (HIIT) a comparable adherence and feasibility to moderate intensity continuous training (MICT)?

**Design:** Randomised, single-blinded, allocation concealed feasibility study with intention to treat analysis.

**Participants:** 30 participants (age from 29 to 69 years) with non-specific chronic low back pain.

**Intervention:** Participants trained 30 minutes on a cycle ergometer for 12 weeks. One group had HIIT and the other MICT.

**Outcome measures:** The primary outcome was adherence rate. Feasibility outcomes were Enjoyability, willingness to continue, recruiting rate, dropout rate and adverse events. Secondary outcomes included pain and disability at baseline and 12 weeks.

**Results:** Of 45 screened subjects 30 participated. The adherence rate was 94% in the HIIT group (median 0.94, IQR 0.23) versus 96% in the MICT group (median 0.96, IQR 0.08), without between-group differences: estimated median of the difference of -0.01 [95% CI, -0.11 to 0.06; p= 0.76]. Similar results in enjoyability (median 3, IQR 1 vs median 2, IQR 1.8) and willingness to continue the training (median 3, IQR 1 vs median 3, IQR 0.4).

Both groups improved in pain and disability, without between-group differences in pain [median of the difference, -0.01; 95% CI, -1 to 2; p=0.94] nor in disability [median of the difference, 1.78; 95% CI, -6.44 to 9.56; p=0.64].

**Conclusion:** There were no differences in adherence rates. HIIT is as feasible as MICT in non-specific chronic low back pain and can be used in future larger trials to deepen the knowledge about HIIT in this specific population.

Betreuungsperson

Roger Hilfiker, PT, MSc

# Comparison of Two Commercially Available Devices to Measure Nitric Oxide Lung Diffusing Capacity in Healthy, Non-Smoking Adults, a Randomized Cross-Over Study

Co-Autor

Thomas Radtke, PhD<sup>1</sup>

<sup>1</sup>Biostatistics and Prevention Institute, Zurich

**Background:** Lung diffusion measurements are commonly used for lung function diagnostics. The usage of nitric oxide (NO), in addition to carbon monoxide (CO) during a lung diffusion measurement, could lead to a better understanding of the process of diffusion.

**Research Question:** This study investigated whether the two on the market available instruments for DLNO measurement ('MasterScreen™' (MS) OFT Pro (Jaeger, Switzerland); 'HypAir' (HA) (Medisoft, Dinant, Belgium)), measure identical at the same time at the same place with the same protocol and with identical subjects.

**Method:** This study followed a single-center randomized cross-over design carried out at the University Hospital of Zurich. 35 healthy subjects of mixed age and sexes were included and randomly allocated to perform slow spirometry, forced spirometry and lung diffusion measurements on either one of the devices. After completing all tasks, the participants performed the exact same maneuvers on the leftover device. The primary outcome was lung diffusion capacity for nitric oxide (DLNO). Secondary outcomes were lung diffusion capacity for carbon monoxide (DLCO), alveolar volume (VA) and breath hold time (BHT). Comparison of primary and secondary outcomes between both devices were calculated by using a linear mixed model.

**Results:** The primary outcome DLNO showed a highly significant difference between the HA and the MS device. The mean difference was 24.1 mL/min/mmHg with a 95%CI of 21.8-26.4 mL/min/mmHg ( $p < 0.0001$ ). For DLCO the difference was not significant with a mean difference of -0.228 mL/min/mmHg (95%CI: -0.571 mL/min/mmHg and 0.116 mL/min/mmHg;  $p > 0.2$ ). The mean difference in alveolar volume between both devices was 0.484 L (95%CI: 0.447-0.512 L;  $p < 0.0001$ ).

**Interpretation:** Although both devices show similar DLCO values, DLNO and VA showed systematic clinically relevant differences. There is no reasonable explanation to justify the difference.

Betreuungsperson

Thomas Radtke, PhD

## Pedrin Denoth

Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

### Co-Autorin/Co-Autoren

Pascal Geitner, BSc<sup>1</sup>

Lukas Krähenbühl, BSc<sup>1</sup>

Konrad S. Stadler, PhD<sup>1</sup>

Eveline S. Graf, PhD<sup>2</sup>

<sup>1</sup>Zurich University of Applied Science, School of Engineering, Institute of Mechatronic Systems, Winterthur

<sup>2</sup>Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

# A Powered Ankle Foot Orthosis Based on Shaft Twisted String Actuation to Assist Persons With Foot-Drop: A Feasibility Study

**Background:** In recent years, various powered ankle foot orthoses (PAFO) have been developed. Most are in an early stage of development and facing different problems. A promising actuation technique in the development of PAFOs is twisted string actuation (TSA). As a disadvantage, previous work showed, that the friction of the strings is influencing the acting torque highly. To reduce the friction and to increase the speed of linear contraction, we layered the strings on a steel shaft rather than on itself. We named the principle shaft twisted string actuation (STSA). The STSA was used in the development of a new STSA-PAFO prototype.

**Methods:** The STSA-System is mounted on a shinpad connected to the shoe with two strings. To enable foot-clearance during the swing phase, the strings get twisted around the shaft and the shoe gets pulled toward the motor. The actuation of the motor is based on the detection of certain gait events with pressure sensitive sensors. We tested the STSA-PAFO on five participants (age 34 – 58) with a diagnosed foot-drop in the gait laboratory. Each participant walked with three conditions inside the laboratory on an even surface: without AFO, with the STSA-PAFO and with their own prescribed AFO. For testing the user-friendliness, the participants rated the STSA-PAFO with the system usability scale (SUS) and their perceived exertion and pressure (NRS 0-10).

**Results:** For all participants the ankle dorsiflexion has increased at initial contact and during swing phase with the STSA-PAFO compared to no orthosis. Compared to the own prescribed AFO, two participants showed an increase in total ROM during swing phase with the STSA-PAFO. A smaller knee flexion was noticed with the STSA-PAFO and the prescribed AFO compared to no orthosis in two participants. In the kinetic data only small changes were found. The overall usability was assessed as good.

**Conclusion** The STSA-PAFO showed good function during user testing in laboratory setting and is a promising approach for further development. The abrasion of the strings in the STSA-PAFO was still high, assumed because of friction in the separator holes.

### Betreuungsperson

Eveline S. Graf, PhD



## Dominik Gross

Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

# Start Back Tool Risk Classification Two Months After Onset of Low Back Pain Can Distinguish Between Mild and Moderate Future Pain in the Short Term – a Prospective One-Year Cohort Study

**Background:** The Start-Back-Tool (SBT) classifies LBP-patients based on modifiable factors which are related to persistent low back pain and disability as low-, medium or high-risk. Yet, there is less clarity around these factors, SBT-groups and their predictive ability in (sub)acute LBP.

**Objective:** The objective was to investigate the ability of SBT at three classification points within the first three months of low back pain to discriminate between recovering and persistent future pain.

**Methods:** A one-year prospective cohort study included 145 acute LBP-subjects (patients, students and employees) from hospitals, physiotherapy practices and universities in canton Zurich, Switzerland. Data were collected online <1, 2, 3, 6 and 12 months after pain onset, with SBT classifications at the first three times. Linear mixed model regression analyses were performed. Differences of future pain intensity and changes of SBT classification were evaluated.

**Results:** Compared to the SBT low-risk group clinically significant higher pain intensities could only be found for: (1) the <1-month SBT high-risk group for the first three months and (2) for the 2-month SBT medium and high-risk group for the following month (at 3-month point). The linear mixed models showed statistically significant group-effects only for 2-month SBT classification. Across all classification points 71-87% were allocated into the low, 10-25% into the medium and 3-4% into the high-risk group. One third changed risk-group allocation: 24-28% improved or recovered and 5-8% worsened within the first three months.

**Conclusions:** SBT risk-classification in the (sub)acute phase of LBP can discriminate between mild and moderate future LBP courses in the short term. Timing of classification matters and SBT-groups are most predictive around a 2-month mark after pain onset. Repeated application of SBT and pattern of group changes could be worth considering in practice and further research.

**Keywords:** STarT Back Tool, acute low back pain, Screening, predictive ability

## Co-Autoren

Fabian Pfeiffer, PT, MSc<sup>1</sup>

André Meichtry, PT, MSc<sup>1</sup>

Hannu Luomajoki, PT, PhD<sup>2</sup>

<sup>1</sup>Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

<sup>2</sup>Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur

## Betreuungsperson

Sabina Hotz Boendermaker, PT, PhD

## Simone Hänni

Bern University of Applied Sciences, Department of Health Professions, Bern

Co-Autorin/Co-Autoren

Patric Eichelberger, PhD<sup>1</sup>

Heiner Baur, PhD<sup>1</sup>

Anja Beugger, PT, BSc<sup>1</sup>

Roy T.H. Cheung, PT, PhD<sup>2</sup>

Tim S. Wang, PT, MSc<sup>2</sup>

<sup>1</sup> Bern University of Applied Sciences, Department of Health Professions, Bern

<sup>2</sup> The Hong Kong Polytechnic University, Department of Rehabilitation Sciences, Gait & Motion Analysis Laboratory, Hong Kong, China

# Knee Joint Load During Stair Climbing The Effect of an Externally or Internally Rotated Foot Progression Angle During Stair Climbing on the Knee Adduction Moment and the Knee Adduction Impulse

**Background:** It has been shown before that by changing the foot progression angle (FPA), there is a reduction of the peaks of knee adduction moment (KAM) and knee adduction impulse (KAI) when walking stairs. However, studies that have examined medial knee joint loads with the parameters described above show certain limitations, such as considering only the peaks of the moments.

**Research question:** Is there a difference in the curve of KAM and KAI while walking stairs with different foot progression angles (normal, internally and externally rotated FPA)?

**Methods:** In this experimental pilot study, the kinematics and kinetics of 24 young, healthy persons were recorded walking with the three different FPAs on a 7-step staircase. A repeated-measure ANOVA and subsequent post-hoc T-test were used to check the significance between the three FPAs in the curve of KAM and KAI.

**Results:** This study showed excellent intraday reliability of FPA, KAM and KAI (ICC > 0.8). The results showed that during descending stairs an internally rotated FPA (iFPA) reduced the KAM over 0-53% and 69-80% of stance phase significantly ( $p < 0.016$ ). When ascending stairs, a significant reduction of KAM ( $p < 0.001$ ) was shown by externally rotated FPA (eFPA) over the whole stance phase. The KAI was significantly reduced by iFPA when walking downstairs and eFPA when walking upstairs ( $p < 0.001$ ).

**Significance:** Since the results partly contradict other studies, it is assumed that factors such as the leg axis and walking speed have an important influence on the change in KAM and KAI.

**Keywords:** foot progression angle, stair climbing, knee adduction moment, knee adduction impulse

Betreuungsperson

Patric Eichelberger, PhD

## Anja Hinteregger

Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

# The Implementation of a Standardised Programme for the Conservative Management of Knee and Hip Osteoarthritis in Switzerland: A Cross-Sectional Survey

**Background:** As of today, the transfer of guideline-based, conservative and non-pharmacological management for hip and knee osteoarthritis into clinical practice has been lacking. "Good Life with Osteoarthritis in Denmark" (GLA:D®), a programme designed to address this gap in care, is now being implemented in Switzerland. This study investigates the acceptance and practicality of the GLA:D® Switzerland programme and identifies the implementation facilitators and barriers in order to support its ongoing implementation.

**Methods:** This is a non-experimental observational study. A cross-sectional survey, including the Measurement Instrument for Determinants of Innovations (MIDI), was performed among the physiotherapists (PTs) of the first five GLA:D® Switzerland certification courses. Descriptive statistics were calculated and presented in the form of tables, figures and text. Qualitative content analysis, combining a deductive and inductive approach, was used for open-ended questions.

**Results:** Of the 141 GLA:D® Switzerland certified PTs contacted, 65 completed the online survey, resulting in a response rate of 46.1%. Of the responding PTs, 78.4% were satisfied with the general concept of the GLA:D® Switzerland programme. Concerning practicality, the PTs conveyed noticeably positive responses. In total, 12 barriers and 12 facilitators to the initial implementation of the GLA:D® Switzerland programme were identified using the MIDI. Barriers were mainly related to the PTs (personal drawbacks, subjective norm) and the organisational context (e.g. time available, unsettled organisation). Facilitators were associated with the GLA:D® Switzerland programme (e.g. completeness, relevance for patients), the PTs (e.g. outcome expectations, self-efficacy), the patient (patient cooperation), and the organisational context (e.g. material resources and facilities, coordinator). Topics related to the socio-political context were raised in the answers to the open-ended questions (e.g. general awareness level of the programme, patient recruitment). The open-ended questions provided a deeper insight into acceptance, practicality and facilitators and barriers.

**Conclusion** Concerning acceptance and practicality of the GLA:D® Switzerland programme, the PTs conveyed noticeably positive responses. The identified facilitators are encouraging for the success of the ongoing implementation. However, the identified barriers require tailored strategies to support the implementation of the GLA:D® Switzerland programme.

Co-Autorinnen/Co-Autor

Karin Niedermann Schneider,  
PT, PhD<sup>1</sup>

Omega E. Huber, PT, PhD<sup>1</sup>

Markus Wirz, PT, PhD<sup>2</sup>

<sup>1</sup>Zurich University of Applied Science, School of Health Professions, Institute of Physiotherapy, Winterthur

<sup>2</sup>Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

Betreuungsperson

Markus Wirz, PT, PhD

Co-Autorinnen/Co-Autor

Angela Blasimann, PT, MSc<sup>1,2</sup>

Kay-Uwe Hanusch, PT, PhD<sup>3</sup>

Susanne Neuenschwander-Blaser, PT, BSc<sup>4</sup>

Heiner Baur, PhD<sup>1</sup>

<sup>1</sup> Bern University of Applied Sciences, Department of Health Professions, Bern

<sup>2</sup> University of Antwerp, Faculty of Medicine and Health Sciences, Department of Rehabilitation Sciences and Physiotherapy, Wilrijk, Belgium

<sup>3</sup> Hospital Emmental, Department of Physiotherapy, Burgdorf

<sup>4</sup> Hospital Emmental, Department of Physiotherapy, Langnau

## Return to Sport After Anterior Cruciate Ligament Rupture – Validation Study of the Test Protocol of a Swiss Regional Hospital

**Objectives:** To validate the test protocol for assessing readiness to return to sport (RTS) in patients with anterior cruciate ligament injury (ACLI) nine months after injury or operation.

**Methods:** Over two years, 186 patients (93 females, 93 males, median age: 35 years, range: 15 - 71 years) with ACLI were assessed in the Hospital Emmental. The test protocol is composed of four field tests (1-repetition maximum with a leg press, Y-Balance test, single leg forward hop and side hop test). In order to assess validity, sensitivity, specificity, positive and negative predictive value, test accuracy and receiver operating characteristic (ROC) curves were computed. Reinjury, Return-to-Sport and Return-to-Life one year after completion of the test protocol served as outcome variables, assessed by a phone call. Furthermore, the previous variables plus single regression analyses were conducted for the tests in the test protocol.

**Results:** The sensitivity of the test protocol was very low (8.3 – 12%), whereas the specificity was high (80 - 100%) for the chosen outcome measures. Sensitivity and specificity for the single tests were also low to moderate and depicted a wide variation (41.5% - 76.6% for sensitivity, 0% - 66.7% for specificity). Single regression analysis showed only significant results between the two hop tests ( $p=0.028$ ,  $R^2=0.12$ ).

**Conclusion:** Low sensitivity rate showed that this test protocol has to be adapted when Reinjury, Return-to-Sport/Life should be detected. When assessing ACL-injured non-professional athletes by a field test setting, adaptations concerning choices of tests and limits for RTS have to be made.

**Keywords:** ACL injury, Reinjury, Return-to-Sport, Return-to-Life, Sensitivity, Specificity

Betreuungsperson

Angela Blasimann, PT, MSc

## Samuel Kälin

Department of Orthopaedic Surgery and Traumatology, Geneva University Hospitals, Geneva

# Development of a Functional Test Battery for Patients With Patellofemoral Pain. An International and Interprofessional Delphi Study

**Purpose:** To develop a functional test battery for patients with patellofemoral pain (pFFTB).

**Methods:** Inclusion criteria for the participants were at least five years of practical and/or scientific experience. 50 patellofemoral experts have been invited: 10 orthopaedic surgeons, 16 physiotherapists and 11 sport physicians from three different continents agreed for participation. In a five round Delphi consensus, the participants were asked about the different ICF (International classification of functioning) categories to be included in a pFFTB, and on how and with which specific tests these categories should be assessed. A consensus for inclusion of an ICF category, a specific test or patient reported outcome measures was obtained if it was rated with at least “5” on a 6-point Likert scale by  $\geq 70\%$  of the participants.

**Results:** The response rate was between 86.5% and 94.6%, with two drop-outs after round 3. The ICF categories included quadriceps/hip abductor strength, dynamic coordination and balance of the leg, mechanical joint stability of the patellofemoral joint and pain. The final pFFTB consists of 5 functional tests: Star Excursion Balance Test, the triple single leg hop test, the single leg side hop test, a hip abductor strength testing with handheld dynamometer and the reversed dynamic patellar apprehension test. Pain will be assessed during the pFFTB and upon the Anterior Knee Pain Scale.

**Conclusion:** An international and interprofessional Delphi consensus for a multimodal pFFTB was found consisting of strength, coordination, balance, joint stability, pain and a patient reported outcome measure.

Co-Autorin/Co-Autor

Lara Allet, PT, PhD<sup>1,2</sup>

Philippe Matthias Tscholl, MD<sup>3</sup>

<sup>1</sup>Department of Community Medicine, Medical Faculty, University Hospitals and University of Geneva, Geneva

<sup>2</sup>School of Health Sciences, HES-SO Valais-Wallis, Sion

<sup>3</sup>Department of Orthopaedic Surgery and Traumatology, Geneva University Hospitals, Geneva

Betreuungspersonen

Philippe Matthias Tscholl, MD

Lara Allet, PT, PhD

## Fabienne Keller

Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur

### Co-Autorin

Irina Nast, PhD<sup>1</sup>

<sup>1</sup>Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur

# Diagnostic and Decision-Making Ability of Swiss Physiotherapists in 2019 – Results of a Questionnaire With Clinical Case Scenarios in a Direct Access Setting

**Background:** Direct access to physiotherapy is not given in Switzerland. Critical questions are still being asked about the physiotherapists' diagnostic and decision-making ability. In 2010, these competencies were investigated among Swiss physiotherapists, while in the same year the first students were graduated with a Bachelor of Science in Switzerland.

The aim is to examine the diagnostic and decision-making ability of Swiss physiotherapists in 2019 and the possible influence on these by the level of training, professional experience or specialization. Finally, the results are compared to those of 2010.

**Methods:** An online national cross-sectional survey was conducted using case scenarios asking about the diagnosis and the treatment management (providing treatment with/without referral to a physician). ANOVA, Kruskal-Wallis- or T-tests were used to examine the association between the percentage of correct solutions and all potential influence factors and the survey dates.

**Results:** A total of 1133 completed questionnaires were analysed. The following results (%±SD) were achieved in the three domains (diagnosis/decision/total case): Medically non-critical scenarios (providing treatment and refer) were solved best overall (61.5%±20.0/77.6%±17.8/ 60.4%±20.5), followed by the musculoskeletal (providing treatment without referral) with 62.0%±21.8/73.7%±20.8/53.9%±22.7 and the medically critical (refer before providing treatment) with 39.3%±30.0/60.0%±31.1/32.5%±28.6. Significant group differences (minimum >10%) were found in training, work experience and specialization. Compared to 2010, the current results were significantly lower in all subgroups (musculoskeletal: diagnosis/total case; medically non-critical: all domains; medically critical: decision).

**Conclusion:** In most cases, the majority of Swiss physiotherapists made the right decisions for management, whereby more professional experience (>11y) and (subsequently acquired) academic degrees seemed to be most helpful. Diagnostic abilities varied and the worse results compared to 2010 may have been contributed by the limitations of this study. Increased teaching of screening in basic training could complete the skills required for direct access.

**Keywords:** clinical decision-making, physiotherapists, referral

### Betreuungspersonen

Irina Nast, PhD

## Annelie Klaus

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

# Usability Evaluation einer Smartphone Applikation für Heimübungen in der Physiotherapie – eine Querschnittsstudie

Co-Autor

Hannu Luomajoki, PT, PhD<sup>1</sup>

<sup>1</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

**Hintergrund:** Einsatz neuer Technologien in der Physiotherapie und die Weiterentwicklung der Smartphone-Applikation (App).

Ziele Prüfung der Usability und User Experience der „My Way Physio“-App und das Definieren von Weiterentwicklungsbereichen.

**Methode:** 18 Therapeuten und 18 Patienten führten erstmalig eine Aufgabenreihe mit der App durch. Die Usability wurde bezüglich ihrer Effektivität (Aufgabenerfolg), Effizienz (Aufgabenzeit), Zufriedenheit (Numeric Rating Scale) und User Experience quantitativ beurteilt. Mittels des Activity Tracking des App-Servers und des User Experience Questionnaire (UEQ) wurden die primären Outcomes erhoben. Für die Auswertung wurde eine beschreibende Statistik angewendet. Sekundäre Outcomes wie Benutzerprobleme und Änderungswünsche wurden mittels einer halbstrukturierten schriftlichen Befragung erhoben und qualitativ ausgewertet.

**Resultate:** Die Studienteilnehmenden zeigten sich effektiv und effizient bei der Durchführung vorbestimmter Aufgaben. Die Zufriedenheit war durchschnittlich positiv. Bis auf den Bereich „Steuerbarkeit“ ist die User Experience mindestens überdurchschnittlich gut bewertet worden.

**Schlussfolgerung:** Die Studienergebnisse dieser Stichprobe bekräftigen die Gebrauchstauglichkeit hinsichtlich Usability und User Experience. Die App scheint eine brauchbare Möglichkeit darzustellen Heimübungen zu erteilen oder zu erhalten. Es konnten Weiterentwicklungsbereiche gefunden und festgelegt werden. Diese zeigten sich hauptsächlich bei „Heimübung / Verlaufszeichen erfassen“ und „Heimübung anschauen / Verlaufszeichen beurteilen“.

Betreuungsperson

Hannu Luomajoki, PT, PhD

## Annika Krug

Wissenschaftliche Abteilung, Reha Rheinfelden, Rheinfelden

### Co-Autorinnen/Co-Autor

Corina Schuster-Amft, PT,  
PhD<sup>1,2,3</sup>

Szabina Gäumann, PT, MSc<sup>1,4</sup>

Anil Aksöz, PhD<sup>1,5</sup>

<sup>1</sup>Wissenschaftliche Abteilung, Reha Rheinfelden, Rheinfelden

<sup>2</sup>Institut für Rehabilitation und Leistungstechnologie, Berner Fachhochschule, Burgdorf

<sup>3</sup>Departement für Sport, Bewegung und Gesundheit, Universität Basel, Basel

<sup>4</sup>Balance Zentrum für Physiotherapie und Medizinisches Training, Muttenz

<sup>5</sup>Motor Learning and Neurorehabilitation Lab, ARTORG Center for Biomedical Engineering Research, Universität Bern, Bern

### Betreuungsperson

Corina Schuster-Amft, PT, PhD

## Erkennung von Augenbewegungen während Bewegungsausführung und Bewegungsvorstellung bei Patienten nach Schlaganfall mit der JINS MEME Brille: eine Test-Retest-Reliabilitätsstudie

**Hintergrund:** Die Technik der Bewegungsvorstellung ermöglicht es Patienten, nach einem Schlaganfall Bewegungen mental zu trainieren und hilft somit, das physische Training zu unterstützen. Die Leistung der Bewegungsvorstellung kann anhand von Gehirnaktivität mittels Elektroenzephalographie und funktioneller Magnetresonanztomographie oder anhand von aufgabenbezogener Augenbewegungen mittels Elektrokulographie objektiv gemessen werden. Es fehlt jedoch bislang ein Messinstrument, das ebenso kostengünstig wie einfach, schnell und mobil innerhalb einer 30-minütigen Therapiesitzung anzuwenden ist.

**Ziel:** Ziel dieser Studie ist es, die JINS MEME Brille als Messinstrument für die Erfassung von Augenbewegungen während Bewegungsausführung und Bewegungsvorstellung auf ihre Test-Retest-Reliabilität bei Schlaganfallpatienten zu prüfen.

**Methode:** Die Augenaktivität wurde mit der JINS MEME Brille bei Patientinnen und Patienten nach erstmaligem Schlaganfall an zwei Messzeitpunkten mit einem Abstand von sieben Tagen erfasst. Während der Messungen führten die Patientinnen und Patienten eine definierte Bewegung der oberen als auch eine Bewegung der unteren Extremität sowohl physisch als auch mental durch. Als Mass für die Übereinstimmung des ersten und zweiten Messzeitpunktes wurde der Intraklassen-Korrelationskoeffizient bestimmt.

**Resultate:** Die Daten wurden von zehn Patientinnen und Patienten (2 Frauen, 8 Männer) mit einer Schlaganfalldiagnose nach 2 Wochen bis 17 Jahren erhoben. Das Durchschnittsalter lag bei  $60 \pm 16$  Jahren. Der mittlere Intraklassen-Korrelationskoeffizient betrug  $0.51 (\pm 0.12)$  für Bewegungsdurchführung und  $0.52 (\pm 0.14)$  für Bewegungsvorstellung bei der Bewegung der oberen Extremität. Ein Intraklassen-Korrelationskoeffizient für die Bewegung der unteren Extremität war aufgrund reduzierter Augenaktivität nicht zu bestimmen.

**Diskussion / Schlussfolgerung:** Die Studie zeigt, dass die JINS MEME Brille geeignet ist, Augenbewegungen von Personen nach erstmaligem Schlaganfall mit einer mässigen Zuverlässigkeit während Bewegungen der oberen Extremität unabhängig von Bewegungsausführung und Bewegungsvorstellung zu erfassen. Die reduzierte Augenaktivität während Bewegungen der unteren Extremität könnte auf das Messsetting zurückzuführen sein. Demnach bedarf es weiterer Forschung bevor die JINS MEME Brille im Praxisalltag zur Anwendung kommen kann.



## Der Effekt einer bimaxillären Okklusionsschiene (dynamisches Zahnschienensystem Stressbite®), auf die posturale Kontrolle und das Gleichgewicht, bei Patienten mit Bruxismus

**Hintergrund/Ziele:** Das kranio-mandibuläre System (CMS) hat über neuroanatomische Verbindungen einen grossen Einfluss auf das muskuloskeletale System. Bruxismus stellt eine Störung des CMS dar und kann somit andere Körperregionen negativ beeinflussen. Zur Standardtherapie zählt die Anfertigung von „Knirscherschienen“. Diese Arbeit geht der Frage nach, welchen Einfluss das dynamische Zahnschienensystem Stressbite®, auf die Postur und das Gleichgewicht bei Patienten mit Bruxismus hat.

**Methoden:** Die Diagnose Bruxismus erfolgte mit dem Bruxismus-Status Protokoll. Die Stressbite® wurde über sechs Wochen nachts getragen. Mit dem Haltungsanalysesystem von Misura la Postura wurden die Bewegungen des Körperschwerpunktes, die plantare Druckverteilung, die HWS-Beweglichkeit und die Körperhaltung zu drei Messzeitpunkten erfasst. Der Allgemein- und Schmerzzustand wurde mit standardisierten Fragebögen erfasst.

**Resultate:** Es kam zu statistisch signifikanten Verbesserungen der HWS-Beweglichkeit. Die Kompetenz des Bewegungsapparates den Körperschwerpunkt zu stabilisieren, verbesserte sich, zeigte aber keine statistische Signifikanz. Bei der Auswertung der plantaren Druckverteilung zeigten sich keine wesentlichen Veränderungen, auch bei der Körperhaltung kam es zu keinen statistisch signifikanten Veränderungen. Das Allgemeinbefinden sowie die Schmerzintensität verbessert sich signifikant.

**Diskussion:** Die Studie konnte zeigen, dass es Zusammenhänge in der neuro-muskulär gesteuerten Ausrichtung der Körperstatik und der Okklusion gibt. Durch die mit dem Stressbite®-System veränderten okklusalen Referenzen scheint es in der Folge zu positiven Veränderungen in der Körperstatik und HWS-Beweglichkeit zu kommen. In wie weit die statistisch nicht signifikanten Ergebnisse klinisch relevant sind, muss weiter untersucht werden.

**Schlussfolgerung:** Die Stressbite® stellt okklusale Normreferenzen her, welche die HWS-ROM und die Schmerzintensität signifikant verbessern und die Stabilisierung des Körperschwerpunktes positiv beeinflusst. Weitere Studien mit grösserem Umfang sind notwendig.

### Co-Autoren

Patrick Vavken, MD<sup>1</sup>

Kian Dilmaghani, MSc<sup>2</sup>

<sup>1</sup>Alphaclinic, Zurich

<sup>2</sup>Zahnarztpraxis Schiffflände –  
Kian Dilmaghani, Basel

Betreuungsperson

Patrick Vavken, MD

## Monika Le-Minh

Reha Rheinfelden, Research Department, Rheinfelden

### Co-Autorin/Co-Autor

Frank Behrendt, PhD<sup>1</sup>

Corina Schuster-Amft, PT,  
PhD<sup>1,2,3</sup>

<sup>1</sup> Reha Rheinfelden, Research  
Department, Rheinfelden

<sup>2</sup> Bern University of Applied  
Sciences, Institute for Reha-  
bilitation and Performance,  
Burgdorf

<sup>3</sup> University of Basel, Depart-  
ment of Sports, Exercise and  
Health, Basel

# Impact of Combined Action Observation and Motor Imagery on Lower Limb Reflex Behavior After Stroke Compared to Age-Matched Healthy Controls A Cross-Sectional Study

**Introduction:** Stroke being one of the major reasons for disability among adults it poses not only a high financial burden for the health care system but also can significantly affect quality of life in stroke survivors. Gait impairments are most commonly reported after stroke. Action observation (AO) and motor imagery (MI) have yielded positive results in gait rehabilitation and showed effects on both cortical and peripheral level of the motor system. The aim of this study was to investigate the impact of AO and MI on reflex modulation of the lower limb in stroke patients compared to healthy age-matched controls.

**Subjects:** Seven persons post cerebrovascular accident (CVA) and three healthy persons (controls).

**Methods:** In a cross-sectional study, P2 reflex responses were measured through EMG of the M. tibialis anterior. Reflex responses were elicited from the foot using stimulation of cutaneous afferents (N. tibialis posterior). The main outcome was the normalized amplitude of reflex responses during congruent AO and MI of walking. The difference between the two relevant walking phases were compared between the stroke and healthy group.

**Results:** No significant impact of combined action observation and motor imagery on lower limb reflex behavior after stroke compared to age-matched healthy controls.

**Conclusion:** Sample size was too small to yield statistically significant results. However, results showed tendencies that stand in line with earlier studies.

### Betreuungsperson

Frank Behrendt, PhD

## Raphael Michael Meier

Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur

# Clinical Assessments Can Discriminate Altered Body Perception in Patients With Unilateral Chronic Low Back Pain, but Not Differences Between Affected and Unaffected Side

Chronic pain disorders appear to be associated with altered body perception. The clinical tools of two-point discrimination (TPD), left/right judgment task (LRJ) and body image drawing (BID) can all be used to assess altered body perception in people with chronic low back pain (CLBP). The aim of this observational study was to examine whether values from TPD, LRJ and BID can determine altered body perception between unilateral CLBP patients' painful and pain-free trunk sides, through the evaluation of some of the underlying mechanisms of body perception. Twenty-seven eligible participants completed all tasks. Inclusion criteria were: unilateral CLBP with duration of over 12 weeks; pain level higher than two out of ten on the numeric rating scale; a minimum score of four points on the Roland Morris Disability Questionnaire (RMDQ). Findings from TPD and BID tests showed an alteration in body awareness. However, no significant interaction effects were found between the affected sides and their measurements (TPD  $p = 0.310$ , LRJ response time  $p = 0.571$ , LRJ accuracy  $p = 0.190$ , BID  $p = 0.751$ ). The profiling of people with high levels of distorted body perception for other factors known to contribute to CLBP may be a useful direction for further investigation.

Co-Autorin/Co-Autor

Patricia Iten, PT<sup>1</sup>

Hannu Luomajoki, PT, PhD<sup>2</sup>

<sup>1</sup>Physiowerk Aadorf

<sup>2</sup>Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur

Betreuungsperson

Hannu Luomajoki, PT, PhD

## Miriam Molter

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

### Co-Autorin

Omega E. Huber, PT, PhD<sup>1</sup>

<sup>1</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

# Praktikable Verlaufsmessinstrumente bei Hüftarthrose, Femoroazetabulärem Impingement und dem Greater Trochanteric Pain Syndrom – eine Literaturübersicht

**Hintergrund:** Der systematische Einsatz von Messinstrumenten unterstützt Physiotherapeuten dabei, Veränderungen des Gesundheitszustandes und der Funktionsfähigkeit zu identifizieren. Es können damit Aussagen über den Therapieverlauf und die Effizienz von Behandlungsmassnahmen gemacht werden, doch sie werden zu wenig angewendet. Gründe sind mässige Kenntnisse und Verfügbarkeit, fehlende Vergütung, Platz- und Zeitmangel. Krankheitsbezogene Übersichten von Messinstrumenten fehlen.

**Ziel:** Das spezifische Ziel war die Zusammenstellung von praktikablen Verlaufsmessinstrumenten und deren Messeigenschaften bei physiotherapierlevanten Hüfterkrankungen.

**Methode:** Für Hüftarthrose, das Femoroazetabuläre Impingement und das Greater Trochanteric Pain Syndrom wurde mit Hilfe einer Literaturrecherche Messinstrumente identifiziert und anhand von vordefinierten Kriterien auf Praktikabilität und Eignung als Verlaufsmessinstrument geprüft. Die Messeigenschaften der Responsivität wurden dafür analysiert: Test-Retest-Reliabilität, der Standardmessfehler, die kleinste messbare Veränderung und die minimale klinisch relevante Veränderung.

**Ergebnisse:** Praktikabilität erfüllten 20 Messinstrumente. Bei der Suche nach Messeigenschaften konnte für acht Fragebögen und sechs klinische Tests entsprechende Literatur gefunden werden. Die gesuchten Werte für Responsivität wurden in zwei Publikationen angegeben.

**Schlussfolgerung:** Die Arbeit präsentiert praktikable und krankheitsspezifische Verlaufsmessinstrumente bei Hüfterkrankungen. Messinstrumente sind aktuell zu wenig auf Responsivität untersucht und Daten dazu nur unvollständig vorhanden.

**Schlüsselwörter:** Messinstrument, Responsivität, Hüftarthrose, Femoroazetabuläres Impingement, Greater Trochanteric Pain Syndrom

### Betreuungsperson

Omega E. Huber, PT, PhD

## Rita Morf

Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

# Prediction and Trend of Tactile Acuity, Pain and Disability in Acute LBP: A Six-Month Prospective Cohort Study

**Background:** Chronic pain is associated with cortical changes and altered tactile acuity. Two-Point Discrimination (TPD) is used in both clinical and research settings to measure tactile acuity. Research shows that TPD threshold (TPDT) is increased in subjects with chronic low back pain (LBP) and is associated with persistent pain. However, it is not known whether TPDT is also altered in acute pain and thus could predict pain and disability in the course of LBP.

The main objectives were to assess TPDT in LBP conditions and the course over six months. In addition, to investigate the predictive value of TPDT for pain and disability three and six months after the onset of acute LBP.

**Methods:** LBP subjects (n=124) with acute LBP (<4 weeks) were included. Subjects were examined within 4 weeks after pain onset and followed-up after 3 and 6 months after pain onset. Horizontal and vertical TPDT were collected of the lower back. Linear mixed models were used to evaluate the effect of TPDT on pain and disability.

**Results:** The vertical TPDT showed a mean (SD) of 4.9cm (1.6), the horizontal TPDT a mean (SD) of 6.0cm (1.5) at baseline. Vertical TPDT altered from baseline up to 6 months from 4.9cm to 4.6cm, the horizontal TPDT from 6.0cm to 5.4cm. The correlations between TPDT and ODI after 6 months were moderate. Between vertical TPDT and NRS after 6 months correlations were weak. Linear mixed models revealed no effects of TPDT on pain and disability over the course of LBP. Negative effects were observed for TPDT and ODI at all timepoints and for TPDT and NRS after 3 months.

**Conclusion:** TPDT in acute LBP were elevated in this study. This offers the possibility of a practical test to assess tactile acuity in acute LBP patients in clinical practice. Our study revealed no prediction of TPDT for disability and pain. In the absence of similar studies, no comparison can be made and therefore further research is needed in this area.

**Keywords:** Tactile acuity, pain, disability, LBP

Co-Autorin/Co-Autoren

Fabian Pfeiffer, PT, MSc<sup>1</sup>

Sabina Hotz Boendermaker, PhD<sup>1</sup>

André Meichtry, PT, MSc<sup>1</sup>

Hannu Luomajoki, PT, PhD<sup>2</sup>

<sup>1</sup>Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

<sup>2</sup>Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur

Betreuungsperson

Hannu Luomajoki, PT, PhD

## Céline Mötteli

Bern University of Applied Sciences, Department of Health Professions, Bern

### Co-Autorin/Co-Autor

Irene König, PT, MSc<sup>1,2</sup>

Jan Taeymans, PhD<sup>1,2</sup>

<sup>1</sup>Bern University of Applied Sciences, Department of Health Professions, Division of Physiotherapy, Bern, Switzerland

<sup>2</sup>Vrije Universiteit Brussel, Faculty of Physical Education and Physiotherapy, Brussels, Belgium

# First Assessment of a Cost Questionnaire for Its Agreement With Administrative Databases in Females With Stress Urinary Incontinence in Switzerland: A Validation Study

**Background:** Economic research in the field of pelvic floor rehabilitation is lacking in transparency of methodology and consideration of indirect costs. Service use questionnaires collect cost data with the broad approach needed for the societal perspective of health economic studies. Nevertheless, these questionnaires are seldom validated. Therefore, this study aimed to evaluate accuracy of a questionnaire to assess healthcare costs of females with stress urinary incontinence in Switzerland.

**Methods:** A questionnaire was developed to measure direct medical and direct non-medical as well as indirect costs in females with stress urinary incontinence. Fourteen participants were recruited out of a prior study sample, where they already completed the cost questionnaire in a four-month timeframe. Administrative databases' cost data were obtained for the investigation period. The agreement between the reported costs of the questionnaire with those from the providers' billings was assessed using Pearson correlation coefficient, intra-class correlation coefficient for agreement, Lin's concordance correlation coefficient and limits of agreement.

**Results:** Agreement between the two methods presented a Pearson's  $r$  of 0.64 [95%CI 0.16 to 1], ICC of 0.79 [95% CI 0.33 to 0.93] and LINCCC 0.75 [95% CI 0.19 to 0.86]. The results showed no evidence for systematically under- or over-reporting.

**Conclusion:** The developed questionnaire seemed to be a good representative for direct medical costs in females with stress urinary incontinence in Switzerland. However, direct non-medical and indirect costs were not compared to an external criterion. Research on a larger sample size would be worthwhile to further clarify the results.

### Betreuungsperson

Jan Taeymans, PhD

## Effect of Short-Term Oxygen Therapy on Exercise Performance in Pulmonary Hypertension Due to Heart Failure With Preserved Ejection Fraction – a Randomized Placebo-Controlled Trial

**Background:** Postcapillary pulmonary hypertension (PH) is a frequent complication of heart failure with preserved ejection fraction (HFpEF) and is characterized by reduced exercise capacity, peripheral edema, fatigue and is associated with poor survival.

**Objectives:** To investigate the effect of short-term oxygen on exercise capacity in PH due to HFpEF Patients.

**Methods:** Monocenter, randomized, single blinded, placebo-controlled crossover trial, investigating 10 PH due to HFpEF patients with 2 incremental exercise tests (IET) and 2 constant work rate exercise tests (CWRET) with each ambient- (normoxia  $FiO_2$  0.21) or oxygen-enriched air (hyperoxia  $FiO_2$  0.50). Maximal workload ( $W_{max}$ ) for IET, endurance time ( $t_{max}$ ) for CWRET, gas exchange, oxygenation of the cerebral tissue (CTO) and quadriceps muscle (QMTO), pulse oximetry ( $SpO_2$ ) and changes in arterial blood gases were measured.

**Results:** Oxygen increased  $W_{max}$  and  $t_{max}$  by mean (95 % confidence interval) +5.4 W (0.9 to 9.8,  $p=0.025$ ) and of +148 s (31.8 to 264.0,  $p=0.018$ ) respectively. Oxygen uptake, carbon dioxide- output and partial pressure ( $PaCO_2$ ),  $SpO_2$ , CTO and QMTO were higher, while heart rate and Borg CR10 dyspnea score were lower under hyperoxia in both tests.

**Discussion/Conclusion:** Exercise performance increases under hyperoxia in IET and CWRET while dyspnea and heart rate were reduced. These improvements were associated with a higher  $PaCO_2$ , decrease ventilation, a more efficient respiration mediated by decreased hyperventilation and lower heart rates which enables the patients to exercise longer at the aerobic energy generating pathway.

Co-Autorinnen

Silvia Ulrich, MD<sup>1,2</sup>

Stéphanie Saxer, PT, PhD<sup>1</sup>

<sup>1</sup>Pulmonary Clinic, University Hospital Zurich

<sup>2</sup>University of Zurich

Betreuungsperson

Silvia Ulrich, MD

Stéphanie Saxer, PT, PhD

## Cristina Raaflaub

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

### Co-Autorinnen

Bettina Sommer, MSc<sup>1</sup>

Eveline S. Graf, PhD<sup>1</sup>

<sup>1</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

# Bewegungsanalyse des Gangbildes beim Tragen von Achillessehnen Spezialschuhen – ein deskriptiver Vergleich von Patienten nach Achillessehnenverletzung und gesunden Probanden

**Hintergrund:** In der frühfunktionellen Therapie nach Achillessehnenverletzung werden Spezialschuhe häufig eingesetzt.

**Material und Methoden:** Vier explorative Einzelfall-Bewegungsanalysen wurden durchgeführt, um das Gangbild von Patienten mit Achillessehnen-Entlastungs-Spezialschuhen mit dem Gangbild von gesunden Probanden zu vergleichen. Die Kontrollgruppen gingen barfuss und waren nach Alter und Geschlecht gematcht.

**Ergebnisse:** Alle Spezialschuhe schränkten den Bewegungsumfang und das Gelenkmoment im Fussgelenk deutlich ein, was die Achillessehne entlastet. Mit dem Orthotech und dem Künzli Absolut wurden mässige Abweichungen in den Gelenkwinkeln und -momenten der Knie und Hüfte von einem normalen Gangbild sichtbar. Beim Vacoped wurden deutlich mehr Abweichungen gefunden. Alle Patienten gingen in ihren Spezialschuhen langsamer und mit asymmetrischen Schrittlängen.

**Schlussfolgerungen:** Der Vacoped mit starrer Bauweise beeinflusste das Gangbild stärker als der Orthotech und Künzli mit flexiblerem Aufbau.

**Schlüsselwörter:** Achillessehnenverletzung, Achillessehnen-Entlastungs-Spezialschuh, Ganganalyse, frühfunktionelle Therapie, Stabilschuh

### Betreuungsperson

Bettina Sommer, MSc



## Tamara Rechenmacher

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

# Praktikable Verlaufsmessinstrumente für Meniskuläsion, Kniearthrose und vordere Kreuzbandverletzung – eine Literaturübersicht

Co-Autorin

Omega E. Huber, PT, PhD<sup>1</sup>

<sup>1</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

**Einleitung:** Auf Grund der steigenden Kosten im Gesundheitswesen sind Angehörige aller Gesundheitsberufe gefordert, die Wirksamkeit ihrer Behandlungsmethoden zu beweisen. Eine Möglichkeit dieser Anforderung gerecht zu werden, ist der systematische Einsatz von Messinstrumenten. Deren Implementierung in den physiotherapeutischen Alltag gelingt zurzeit zu wenig. Mögliche Hilfestellungen sind krankheitsspezifische Übersichten an praktikablen und geeigneten Messinstrumenten.

**Ziel:** Das Ziel dieser Arbeit war die Zusammenstellung von praktikablen und krankheitsspezifischen Verlaufsmessinstrumenten und deren Messeigenschaften für typische Knieproblematiken.

**Methodik:** Eine Literatursuche für Meniskuläsion, Kniearthrose und vordere Kreuzbandverletzung wurde zur Identifikation von Messinstrumenten durchgeführt. Anhand von vordefinierten Kriterien wurden alle Messinstrumente auf Praktikabilität geprüft. Im Folgenden wurden die Messinstrumente auf die Eignung als Verlaufsmessinstrument hin überprüft. Dazu wurden Messeigenschaften wie Test-Retest Reliabilität, die minimale klinisch relevante Veränderung, der Messfehler und die kleinste messbare Veränderung identifiziert. Alle extrahierten Messeigenschaften wurden pro Messinstrument in einer Übersicht zusammengetragen.

**Ergebnisse:** Es wurden 28 Messinstrumente als praktikabel eingestuft. Die am häufigsten untersuchte Messeigenschaft war die Test-Retest Reliabilität. Ein Drittel aller Studien zu den Messeigenschaften berichteten Daten zum minimalen klinisch relevanten Veränderungswert. Die Hälfte der Artikel präsentierten Werte für die kleinsten messbaren Veränderung und den Messfehler.

**Schlussfolgerung:** Die Arbeit präsentiert eine Übersicht an geeigneten und praktikablen Messinstrumenten für häufige Knieproblematiken. Viele Studien zeigen einen Mangel an Messeigenschaften. Diese Aspekte müssen dringend noch weiter untersucht werden.

Betreuungspersonen

Omega E. Huber, PT, PhD

Co-Autorinnen/Co-Autor

Anja Frei, PhD<sup>1</sup>

Sarah R. Haile, PhD<sup>1</sup>

Thomas Radtke, PhD<sup>1</sup>

<sup>1</sup>Biostatistics and Prevention  
Institute, Zurich

## The Impact of Walking Behind the Patient on Six-Minute Walk Test Distance in COPD: A Randomised Cross-Over Study

**Study question:** Is there a difference in the 6-Minute Walk Test (6MWT) distance when the assessor walks behind the patient compared to the patient walking alone?

**Methods:** We conducted a randomised cross-over study to evaluate the impact of the assessor walking behind the patient during 6MWT (6MWT<sub>followed</sub>) versus patient walking alone (6MWT<sub>alone</sub>). At the end of a pulmonary rehabilitation programme, each patient performed two 6MWTs in random order and separated by 30 minutes rest.

**Results:** 49 COPD patients GOLD II-IV were included. In a regression model adjusted for sequence-period and subject, walking behind the patient resulted in a lower walking distance (mean difference -9.1 m, [95%CI, -13.9 to -4.3],  $p < 0.001^*$ ). Notably, six patients walked more than 30m further (minimal important difference, MID) in one of the two conditions (6MWT<sub>followed</sub>: n=1, 6MWT<sub>alone</sub>: n=5). There were no between-sequence-group differences in heart rate, dyspnoea scores, Borg scores and oxygen saturation (SpO<sub>2</sub>). A high number and duration of signal artefacts during pulse oximetry measurements (6MWT<sub>followed</sub>: n 17 [4, 24], 34 [7, 113] seconds, 6MWT<sub>alone</sub>: n 11 [3, 26], 24 [4, 62] seconds) were observed in both experimental conditions but no significant difference between conditions.

**Answer to the question:** Although we observed a highly statistically significant difference in 6MWT distance between the two experimental conditions on a study population level, the observations may not be considered clinically relevant since they lay below the well-established MID of 30m in COPD. However, for individual patients unaccompanied walking results in a substantially higher walking distance.

Betreuungsperson

Anja Frei, PhD

Anja Marina Roth

University of Applied Sciences and Arts Western Switzerland - Geneva,  
Genève

# Loosing While Winning – How to Keep Lean Mass During Weight Loss. A Systematic Review and Meta-Analysis.

**Background:** Literature has shown that after a diet- or surgery induced weight loss almost 1/3 of lost weight consists of fat free mass (FFM) such as bone and muscle mass, if carried out without additional therapy. The implementation of physical training and a sufficient supply of protein, calcium and vitamin D is recommended to reduce the loss of FFM. However, no systematic review and meta-analysis have been carried out to evaluate the effect of these interventions on preserving FFM.

**Objective:** To investigate the effect of physical training, protein, calcium and vitamin D supplementation on the preservation of FFM expressed as FFM, BMD and muscle mass during non-surgical and surgical weight loss and of the combination of all interventions together in overweight and obese adults. Methods: A systematic review with a pairwise and network meta-analysis was performed according to the PRISMA Statement using the electronic databases MEDLINE, EMBASE, CENTRAL and Web of Science for the search of eligible trials. This systematic review was registered on PROSPERO (CRD42019134651).

**Results:** Twenty-eight studies were included in the quantitative analysis. The network meta-analysis showed for Physical Training + Vitamin D the highest effect size (SMD 2.04; 95% CI 0.05 to 4.02), followed by Physical Training + High Protein (SMD 1.72; 95% CI 0.57 to 2.88) and Physical Training + Calcium + Vitamin D. Three interventions showed statistically significant effect sizes and all of them included the treatment Physical Training.

**Conclusions:** Physical training plus protein supplementation seems to be superior to only physical training, only protein supplementation and to no additional therapy during weight loss. Further research is required to confirm this result and to investigate which group of patients benefit from a calcium and vitamin D supplementation.

Co-Autorinnen

Lara Allet, PT, PhD<sup>1</sup>

Simone Gafner, PT, MSc<sup>2</sup>

<sup>1</sup>University of Applied Sciences and Arts Western Switzerland - Valais-Wallis, Sion

<sup>2</sup>University of Applied Sciences and Arts Western Switzerland - Geneva, Genève

Betreuungsperson

Lara Allet, PT, PhD

## Riana Saba

Zürcher Hochschule für angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

### Co-Autorinnen

Karin Niedermann Schneider,  
PT, PhD<sup>1</sup>

Anne-Kathrin Rausch-Ost-  
hoff, PT, MSc<sup>2</sup>

<sup>1</sup>Zürcher Hochschule für an-  
gewandte Wissenschaften  
(ZHAW), Institut für Physio-  
therapie, Winterthur

<sup>2</sup>Zürcher Hochschule für an-  
gewandte Wissenschaften  
(ZHAW), Forschung und Ent-  
wicklung, Institut für Physio-  
therapie, Winterthur

# Deutsche Übersetzung und Validie- rung der Exercise Self-Efficacy Scale für körperliche Aktivität bei Ankylo- sierende Spondylitis-Betroffenen

**Schlüsselwörter:** Ankylosierende Spondylitis, Selbstwirksamkeit, körperliche Aktivität, Reliabilität, Validität

**Hintergrund:** Ankylosierende Spondylitis-Betroffenen wird empfohlen, sich mit Hilfe eines Heimprogramms regelmässig körperlich zu betätigen, um eine Verbesserung der Symptomatik zu erzielen. Die Selbstwirksamkeit für körperliche Aktivität ist ein Schlüsselfaktor für ein optimales Bewegungsverhalten und kann mit dem Fragebogen „Exercise Self-Efficacy Scale“ erfasst werden. Bislang gab es noch keine validierte, deutsche Version des Fragebogens.

**Ziel:** Das Ziel der Studie war, die «Exercise Self-Efficacy Scale» auf Deutsch zu übersetzen und deren psychometrischen Eigenschaften bei Ankylosierende Spondylitis-Betroffenen zu beurteilen.

**Methode:** Das TRAPD Team Translation Model wurde verwendet, um den Fragebogen zu übersetzen. Die Reliabilitätsberechnung erfolgte mittels Intraklassen-Korrelation in einem Test-Retest Design und die interne Konsistenz mittels Cronbach's Alpha. A-priori definierte Korrelationen zwischen der «Exercise Self-Efficacy Scale» und anderen Fragebogen wurden verwendet, um die Konstruktvalidität in einem Querschnittsdesign zu analysieren.

**Ergebnisse:** Der komplette Fragebogen wurde auf Deutsch übersetzt. Die Intraklassen-Korrelation ergab 0.84 (95%CI; 0.65 - 0.92) und das Cronbach's Alpha 0.85. Eine von acht definierten Korrelationen wurde bestätigt.

**Schlussfolgerung:** Die Ergebnisse zeigten eine gute Test-Retest Reliabilität und interne Konsistenz. Die Konstruktvalidität fiel hingegen gering aus. Schlussfolgernd kann die Selbstwirksamkeit für körperliche Aktivität bei Ankylosierende Spondylitis-Betroffenen im deutschsprachigen Raum erhoben werden. Weitere Forschung zur Konstruktvalidität wird empfohlen.

### Betreuungsperson

Marina Bruderer, PT, MSc

Sabine Schibli

Schulthess Klinik, Department of Teaching, Research and Development, Zurich

# Robotic-Mediated Therapy for Chronic Rotator Cuff Tears Associated With Pseudoparalysis or Pseudoparesis Proofs Feasible With Positive Trend: A Feasibility Study

**Introduction:** Degenerative rotator cuff (RC) tears associated with pseudoparalysis or pseudoparesis are often irreparable and one of the most challenging conditions in shoulder pathologies. However, with increasing age and comorbidities, surgery becomes more complicated. The aim of this study was to evaluate the feasibility of a robotic-mediated therapy and its potential benefits for patients with RC tears associated with pseudoparalysis or pseudoparesis.

**Material and methods:** Patients with chronic, irreparable RC tears and signs of a pseudoparalysis or pseudoparesis conducted a specific robotic-mediated training over six weeks. Feasibility criteria including level of satisfaction, adherence to training and tolerance of treatment were analysed descriptively and explorative. Secondary outcomes, including active flexion and abduction, subjective shoulder value, Oxford shoulder score and quality of life were analysed descriptively and with a paired non-parametric Wilcoxon-test.

**Results:** Six patients completed the intervention. Adherence rate was 98%. Patients reported no or minimum pain in 97% of all training sessions. Overall satisfaction of patients reached a median of 8/10 after six weeks and 6.5/10 after twelve weeks. The secondary outcome showed a positive tendency for active shoulder mobility. The median of the differences from baseline for flexion was 25 degrees after six and 15 degrees after twelve weeks and for abduction 12.5 degrees after six and 25 degrees after twelve weeks.

**Conclusion:** This robotic-mediated treatment for patients suffering from RC tears with a pseudoparalysis or pseudoparesis was feasible and tolerable and additionally promises satisfying results for shoulder mobility and function and therefore as well in quality of life.

**Keywords:** Pseudoparalysis, pseudoparesis, rotator cuff tear, robotic-mediated therapy, MJS TecnoBody

Co-Autoren

Laurent Audigé, PhD<sup>1,2</sup>

Markus Scheibel, MD<sup>2,3</sup>

<sup>1</sup>Schulthess Klinik, Department of Teaching, Research and Development,

<sup>2</sup>Schulthess Klinik, Shoulder and Elbow Surgery, Zurich

<sup>3</sup>Charité - Universitätsmedizin, Shoulder and Elbow surgery - Center for Musculoskeletal Surgery, Berlin, Germany

Betreuungspersonen

Laurent Audigé, PhD

## Martina Steger

Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

### Co-Autorin/Co-Autoren

Sabina Hotz Boendermaker, PhD<sup>1</sup>

Fabian Pfeiffer, PT, MSc<sup>1</sup>

André Meichtry, PT, MSc<sup>1</sup>

<sup>1</sup>Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur

## The Predictive Values of Early Depression, Anxiety, Stress, the Timeline, Low Self-Control and Help-/ Hopelessness on the Course of Low Back Pain in Primary Care and the General Population: A One-Year Prospective Cohort Study

**Objectives:** The aim of this study is to know whether the psychological factors depression, anxiety, stress and altered illness perception in a strictly defined acute stage of low back pain (LBP) can predict persistent disability and pain after three, six and twelve months in primary care patients and the general population.

**Design:** A one-year prospective cohort study was conducted.

**Setting:** The participants were recruited both from the general population and from primary care (physiotherapy and medical practices) in Zurich, Switzerland.

**Participants:** 142 persons with acute LBP (< one month) were recruited.

Main outcome measures: Unadjusted and adjusted linear mixed models were performed for the emotional factors depression, anxiety, stress (Depression Anxiety Stress Scale) and state-anxiety (State and Trait Anxiety Inventory) and for the cognitive factors low self-control, timeline (Illness Perception Questionnaire) and help-/hopelessness (Avoidance Endurance Questionnaire) on the outcomes disability (Oswestry Disability Index) and pain intensity (Numeric Rating Scale).

**Results:** The unadjusted linear mixed models showed low, but statistically significant predictive values for anxiety (0.49, CI 0.09 to 0.89), state-anxiety (0.13, CI 0.05 to 0.22), stress (0.29, CI 0.04 to 0.53) and timeline (0.39, CI 0.09 to 0.69) on disability after three months and for anxiety (0.18, CI 0.02 to 0.34) and self-control (0.20, CI 0.03 to 0.37) on pain intensity after three months. Stress showed additional predictive values on disability after six months (0.39, CI 0.08 to 0.70). The adjusted linear mixed models confirmed the predictive values for state-anxiety and timeline on disability after three months with 0.11 (CI 0.01 to 0.22) and 0.35 (CI 0.05 to 0.66) respectively. In both models, depression and help-/hopelessness showed no significant predictive values and no psychological factor had significant influence on disability or pain intensity at twelve months.

**Conclusion:** The results indicate that emotional and cognitive psychological factors in the early acute stage of LBP, especially state-anxiety and the timeline, may influence disability and pain intensity after three and six months but no longer at twelve months. Further research in patients with higher levels of psychological factors is needed to verify these results.

### Betreuungsperson

Sabina Hotz Boendermaker, PhD

## Andrea Stehrenberger

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

# Praktikable Verlaufsmessinstrumente für Sprunggelenksdistorsion, Achillestendinopathie und Sprunggelenksfraktur – eine Literaturübersicht

Co-Autorin

Omega E. Huber, PT, PhD<sup>1</sup>

<sup>1</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

**Einleitung:** Messinstrumente zur Überprüfung des Heilungsverlaufes werden in der Physiotherapie zu selten angewendet. Dies unter anderem aufgrund von mangelnden Kenntnissen über die vorhandenen Messinstrumente.

**Ziel:** Das Ziel dieser Arbeit ist die Zusammenstellung von Verlaufsmessinstrumenten und deren Messeigenschaften für relevante Fußproblematiken in der Physiotherapie.

**Methodik:** Eine Literatursuche für Sprunggelenksdistorsion, Achillestendinopathie und Sprunggelenksfraktur wurde zur Identifikation von Messinstrumenten durchgeführt. Anhand von vordefinierten Kriterien wurden alle Messinstrumente auf Praktikabilität geprüft. Im Folgenden wurden die Messinstrumente auf die Eignung als Verlaufsmessinstrument hin überprüft. Dazu wurden Messeigenschaften der Responsivität, wie die minimale klinisch relevante Veränderung, der Messfehler und die kleinste messbare Veränderung identifiziert. Alle extrahierten Messeigenschaften wurden pro Messinstrument in einer Übersicht zusammengetragen.

**Ergebnisse:** 28 Messinstrumente wurden als praktikabel eingestuft. Bei sieben Messinstrumenten wurden Gütekriterien zu Messeigenschaften der Responsivität gefunden. Zweidrittel der Artikel befassen sich mit der kleinsten messbaren Veränderung und weniger als die Hälfte der Artikel mit dem Messfehler.

**Schlussfolgerung:** Die Arbeit präsentiert eine Übersicht an geeigneten und praktikablen Messinstrumenten für häufige Fußproblematiken. Viele Studien zeigen einen Mangel an Messeigenschaften zur Responsivität. Diese Aspekte müssen noch weiter untersucht werden.

Betreuungsperson

Omega E. Huber, PT, PhD

Co-Autorinnen

Agathe Koller, PhD<sup>1</sup>

Silvia Rohner, PhD<sup>1</sup>

<sup>1</sup>Hochschule für Technik Rapperswil

## Feasibility and Preliminary Efficacy Testing of an Exosuit for Patients With Unilateral Gait Impairments

**Background:** Garment-like wearable robotic exoskeletons, also called Exosuits, mimic the human gait and ought to retrain or assist activities of daily living (ADL). This article introduces a new prototype Exosuit. The goal of an Exosuit is to augment the mobility of a gait impaired user. It has not yet been examined how the targeted population reacts to this type of intervention in physiotherapy neurorehabilitation setting.

**Objective:** The goal of this study was to determine the acceptability and test the efficacy for intermediate preliminary outcomes of the current available prototype Exosuit for patients with gait disorders.

**Methods:** A mixed-method design with a qualitative content analysis to assess the acceptability of the participants and a within subject quantitative testing protocol with a 2D video-analysis on a dichotomous scale to assess the alterations in gait between wearing and not wearing the Exosuit.

**Results:** 5 participants were enrolled from which 2 completed the protocol. 5 themes derived from the content analysis: User experience, vision of future prospects, improvement suggestions, efficacy and opinion on the testing procedure. Gait alterations in general, torso, pelvis, hip, knee and ankle are established between wearing the Exosuit and not wearing the Exosuit.

**Discussion/Conclusion:** The current design of the Exosuit tends to be not efficacious, but the target population seems to be accepting the Exosuit as a potential treatment. This acceptability of the targeted population suggests that the current Exosuit design is suitable for further development but not yet ready to be used in a clinical setting.

Betreuungspersonen

Agathe Koller, PhD

Silvia Rohner, PhD



## Ulisse Patrizio Vogt

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

# Analyse von Kommunikations- und Verhaltensänderungstechniken von Physiotherapeuten/-innen während der Bewegungsberatung mit Morbus-Bechterew-Betroffenen

**Hintergrund:** Die Kommunikation ist im Gesundheitswesen ein wichtiger Handlungsaspekt von Gesundheitsfachpersonen. In diesem Kontext sind physiotherapeutische Kommunikations- und Verhaltensänderungstechniken ein wesentlicher Bestandteil der Patientenedukation. In der Physiotherapie ist wenig über die Anwendung dieser Techniken bekannt.

**Ziel:** Analyse angewandter Kommunikations- und Verhaltensänderungstechniken von Physiotherapeuten/-innen der Schweizerischen Vereinigung Morbus-Bechterew-Bewegungsgruppen in einer Bewegungsberatung mit Bechterew-Betroffenen.

**Methode:** Empirische Querschnittstudie unter allen Physiotherapeuten/-innen der 17 Bewegungsgruppen, die 2019 im Rahmen der Implementierungsstudie (Niedermann et al., 2018-2021) in das Be-Fit Konzept eingeführt wurden.

**Ergebnisse:** 12 Physiotherapeuten/-innen und 41 Bechterew-Betroffene nahmen teil. 41 Beratungen wurden ausgewertet. Insgesamt wandten die 12 Physiotherapeuten/-innen über die 41 Gespräche 32 Kommunikationstechniken des „The Calgary Cambridge Referenced Observation Guide One“ und 15 Verhaltensänderungstechniken des „Coding manual for behavioral change techniques“ an.

**Schlussfolgerung:** Die Anwendung von Kommunikations- und Verhaltensänderungstechniken ist ein wichtiger Bestandteil einer physiotherapeutisch angeleiteten Bewegungsberatung mit Bechterew-Betroffenen. Die Physiotherapeuten wandten viele Kommunikations- und wenige Verhaltensänderungstechniken an. Die Ergebnisse bilden die Basis für die weitere, vertiefte Auseinandersetzung mit der Thematik und der Entwicklung von Kompetenzen in den Technikanwendungen, vor allem im Bereich der Verhaltensänderung.

### Co-Autorinnen

Karin Niedermann Schneider,  
PT, PhD<sup>1</sup>

Anne-Kathrin Rausch-Osthoff,  
PT, MSc<sup>2</sup>

<sup>1</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur

<sup>2</sup>Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur

### Betreuungsperson

Karin Niedermann Schneider,  
PT, PhD

## Christina Wettengl

Laboratory of Movement Biomechanics, Department of Health Science and Technology, Institute of Biomechanics, ETH Zurich, Zurich

### Co-Autoren

Navrag B. Singh, PhD<sup>1</sup>

Kim Yong Kuk, MEng<sup>1</sup>

Milos Milicevic, MSc<sup>1</sup>

Deepak K. Ravi, MTech<sup>1</sup>

<sup>1</sup>Laboratory of Movement Biomechanics, Department of Health Science and Technology, Institute of Biomechanics, ETH Zurich, Zurich

## Contribution of 1a Afferent Fibers to Motor Control During Walking Under Different Body Mass Conditions

**Background:** Walking is an important ability for independence and mobility of humans. Since the neurophysiological control mechanisms during walking are not fully understood, this study investigated the peak-to-peak (PtP) amplitude of the soleus Hoffmann reflex (H-reflex) in order to measure the contribution of 1a afferent fibers during walking under different body mass conditions in young, healthy participants.

**Methods:** 19 healthy participants, ten males and nine females (mean (SD): age: 23.2 (2.1) years, height: 174.4 (7.5) cm, body mass: 69.3 (8.2) kg; BMI: 22.8 (2.3)) were included. A linear mixed effects model was conducted to analyze the difference in the PtP amplitude of the H-reflex under five body mass (BM) conditions (+40% BM, +20% BM, normal walking (NW), -20% BM, -40% BM).

**Results:** The PtP amplitude was significantly higher (0.314 (0.029) mV) in the +40% BM than in the -40% BM condition ( $p=0.000$ ). There was a significant difference between -20% BM and +20% BM ( $p=0.018$ ) and between the +20% BM and +40% BM ( $p=0.001$ ). No difference between could be found NW and -20% BM ( $p=0.654$ ) respectively +20% BM ( $p=0.077$ ).

**Discussion:** The PtP amplitude of H-reflex increased with mass. This upregulation from the relieved to the loaded condition showed, that the strategies of motor control changed with mass. This could indicate an increase in excitability of the triceps surae stretch reflex with the purpose of increase lower limb stability.

### Betreuungsperson

Navrag B. Singh, PhD



# Die Diplomandinnen und Diplomanden

## des Master-Studiengangs Physiotherapie 2020 und ihre Betreuungspersonen

Name	Arbeitsort	E-Mail
Sibylle Achermann	Physiotherapie Sauser, Gerlafingen	achersib@hotmail.com
Marina Aerni	LUKS Wolhusen	marina_ay@hotmail.com
Anja Beugger	Solothurner Spitäler AG, Kantonsspital Olten, Olten	beugger.anja@gmail.com
Manuela Bischofberger	Physiotherapie Bischofberger	Manuelabischofberger@gmail.com
Luigi-Riccardo Calendo	Physiotherapie Auravita, Rapperswil	lr.calendo@icloud.com
Letizia Cappelletti	Physiotherapie trainierbar, Basel	leticap@gmx.ch
Tamara Cerini	Schulthess Clinic, Zurich	tamaracerini@gmail.com
Quintin de Groot	Kantonsspital Winterthur	Quintindegroot93@gmail.com
Pedrin Denoth	Medbase Einstein, St. Gallen	Pedrin.denoth@gmail.com
Dominik Gross	Kantonsspital Winterthur	dominikgross@gmx.net
Simone Hänni	Physiotherapie Simone Hänni, Burgdorf	simone.haenni@outlook.com
Anja Hinteregger	Physiozentrum Wetzikon	anja@hinteregger.at
Sabrina Imhof	Universitätsklinik Balgrist, Zürich	sabrina.imhof.86@gmail.com
Samuel Kälin	Department of Orthopaedic Surgery and Traumatology, Geneva University Hospitals, Geneva	samuel.kaelin@hcuge.ch

Betreuungsperson/-en	Affiliation der Diplomandinnen und Diplomanden
Heiner Baur, PhD	Bern University of Applied Sciences, Department of Health Professions, Bern
Karina Ottiger-Böttger, PT Markus Ernst, PT, MSc	Zentrum für Schmerzmedizin, Nottwil
Heiner Baur, PhD	Bern University of Applied Sciences, Department of Health Professions, Bern
Olliver Stoller, PhD	Rehaklinik Zihlschlacht
Silvia Ulrich, MD Stéphanie Saxer, PT, PhD	Pulmonary Clinic, University Hospital Zurich
Corina Schuster-Amft, PT, PhD	Reha Rheinfelden, Research Department, Rheinfelden
Roger Hilfiker, PT, MSc	Schulthess Klinik, Zurich
Thomas Radtke, PhD	Biostatistics and Prevention Institute, Zurich
Eveline S. Graf, PhD	Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur
Sabina Hotz Boendermaker, PT, PhD	Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur
Patric Eichelberger, PhD	Bern University of Applied Sciences, Department of Health Professions, Bern
Markus Wirz, PT, PhD	Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur
Angela Blasimann, PT, MSc	Bern University of Applied Sciences, Department of Health Professions, Bern
Philippe Matthias Tscholl, MD Lara Allet, PT, PhD	Department of Orthopaedic Surgery and Traumatology, Geneva University Hospitals, Geneva

# Die Diplomandinnen und Diplomanden

## des Master-Studiengangs Physiotherapie 2020 und ihre Betreuungspersonen

Name	Arbeitsort	E-Mail
Fabienne Keller	HESAV - School of Health Sciences, HES-SO University of Applied Sciences and Arts, Western Switzerland, Lausanne	kellerfabienne@bluewin.ch
Annelie Klaus	Physio Zwicky GmbH, Wallisellen	annelie.klaus@physio-zwicky.ch
Annika Krug	Physiotherapie Moser & Klumpp, Binningen	annika.krug@bluewin.ch
Marc Kwidzinski	Axis Reha und Training, Thalwil	marc.kwidzinski@freenet.de
Monika Le-Minh	Life Physiotherapie Sangeorzan, Laufen Physio Jordi, Riehen	monikaleminh@gmail.com
Raphael Michael Meier	Pro dorso Zentrum für Wirbelsäulenmedizin, Zürich	raphymeier@gmx.ch
Miriam Molter	Physiotherapie Miriam Molter	miriam@physio-molter.ch
Rita Morf	Medbase Winterthur Archhöfe	rita.morf@hotmail.com
Céline Mötteli	Brunner Physiotherapie Kloten	c.moetteli@gmx.ch
Julian Müller	Universitätsspital Zürich, Klinik für Pneumologie, Pulmonale Hypertonie	mueller.julian1990@web.de
Cristina Raaflaub	Hof Weissbad, Weissbad	cristina.raaflaub@gmx.ch
Tamara Rechenmacher	-	t.rechenmacher@gmx.ch
Thomas Riegler	Berner Reha Zentrum AG	t.riegler@rehabern.ch
Anja Marina Roth	Medbase Bern Westside, Bern	roth.anja@bluewin.ch

<b>Betreuungsperson/-en</b>	<b>Affiliation der Diplomandinnen und Diplomanden</b>
Irina Nast, PhD	Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur
Hannu Luomajoki, PT, PhD	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur
Corina Schuster-Amft, PT, PhD	Wissenschaftliche Abteilung, Reha Rheinfelden, Rheinfelden
Patrick Vavken, MD	Alphaclinic, Zurich
Frank Behrendt, PhD	Reha Rheinfelden, Research Department, Rheinfelden
Hannu Luomajoki, PT, PhD	Zurich University of Applied Sciences, School of Health Professions, Institute of Physiotherapy, Winterthur
Omega E. Huber, PT, PhD	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur
Hannu Luomajoki, PT, PhD	Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur
Jan Taeymans, PhD	Bern University of Applied Sciences, Department of Health Professions, Bern
Silvia Ulrich, MD Stéphanie Saxer, PT, PhD	Pulmonary Clinic, University Hospital Zurich
Bettina Sommer, MSc	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur
Omega E. Huber, PT, PhD	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Institut für Physiotherapie, Winterthur
Anja Frei, PhD	Biostatistics and Prevention Institute, Zurich
Lara Allet, PT, PhD	University of Applied Sciences and Arts Western Switzerland - Geneva, Genève

# Die Diplomandinnen und Diplomanden

des Master-Studiengangs Physiotherapie 2020 und ihre Betreuungspersonen

Name	Arbeitsort	E-Mail
Riana Saba	Movecenter Feldmeilen, Feldmeilen	rianasaba@hotmail.com
Sabine Schibli	LUKS Wolhusen	schiblisabine@gmail.com
Martina Steger	Physiotherapie Bodenweid, Bern	martinasteger@gmx.ch
Andrea Stehrenberger	Spital Limmattal	andrea.stehrenberger@hispeed.ch
Jasper van Steenhoven	Physio Sports GmbH	jaspervansteenhoven@gmail.com
Ulisse Patrizio Vogt	startpunkt physiotraining GmbH, Zürich	ulisse_vogt@hotmail.com
Christina Wettengl	Physio und Sport am Bahnhof, Baden	ch_wettengl@gmx.at



Betreuungsperson/-en	Affiliation der Diplomandinnen und Diplomanden
Karin Schneider Niedermann, PT, PhD Anne-Kathrin Rausch-Osthoff, PT, MSc	Zürcher Hochschule für angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur
Laurent Audigé, PhD	Schulthess Klinik, Department of Teaching, Research and Development, Zurich
Sabina Hotz Boendermaker, PhD	Zurich University of Applied Sciences, School of Health Professions, Research and Development, Institute of Physiotherapy, Winterthur
Omega E. Huber, PT, PhD	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur
Agathe Koller, PhD Silvia Rohner, PhD	Hochschule für Technik Rapperswil
Karin Schneider Niedermann, PT, PhD	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Forschung und Entwicklung, Institut für Physiotherapie, Winterthur
Navrag B. Singh, PhD	Laboratory of Movement Biomechanics, Department of Health Science and Technology, Institute of Biomechanics, ETH Zurich, Zurich





**Berner Fachhochschule**

Gesundheit

Master-Studiengang Physiotherapie

Murtenstrasse 10

CH-3008 Bern

[bfh.ch/gesundheit](http://bfh.ch/gesundheit)

[mscphysiotherapie.gesundheit@bfh.ch](mailto:mscphysiotherapie.gesundheit@bfh.ch)

Telefon +41 31 848 47 22

**Zürcher Hochschule für Angewandte Wissenschaften**

Departement Gesundheit

Master-Studiengang Physiotherapie

Katharina-Sulzer-Platz 9

CH-8400 Winterthur

[zhaw.ch/gesundheit](http://zhaw.ch/gesundheit)

[master.physiotherapie@zhaw.ch](mailto:master.physiotherapie@zhaw.ch)

Telefon +41 58 934 63 77