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Abstracts 2018

# Masterarbeiten Master of Science in Physiotherapie (MScPT) Studiengang 2015



# Editorial

Sehr geehrte Leserin, sehr geehrter Leser

Wir freuen uns, Ihnen bereits den sechsten Abstractband der Masterarbeiten des Studiengangs Master of Science in Physiotherapie (MScPT) zu präsentieren.

Wiederum sind viele interessante Arbeiten aus einem breiten Spektrum entstanden. Sie zeigen die Bandbreite der Forschungsfragen ebenso wie die vielseitigen Methoden, die in der Physiotherapie-Forschung zur Beantwortung der Fragestellungen eingesetzt werden.

Das Ziel ist immer auch die Dissemination der wissenschaftlichen Masterarbeiten. Master-Absolvierende präsentieren ihre Arbeiten dann auch oft an Kongressen, was ein Signum für die Qualität dieser Arbeiten ist. Darüber hinaus geben sie die Erkenntnisse auch an die klinisch tätigen Kolleginnen und Kollegen in der Praxis weiter. So werden viele Masterarbeiten jeweils in englisch- oder deutschsprachigen Fachzeitschriften publiziert. Die Publikation ist ein Prozess, bei dem die Master-Absolvierenden oft nochmals ihr Durchhaltevermögen unter Beweis stellen.

Den frischgebackenen Physiotherapeutinnen und Physiotherapeuten MSc gratulieren wir herzlich zu ihren gelungenen Masterarbeiten und zu ihrem Abschluss. Allen, die an der Ausbildung, Förderung und Unterstützung unserer Absolvierenden beteiligt waren, danken wir herzlich.

Wir wünschen Ihnen eine anregende Lektüre.



A handwritten signature in black ink, appearing to read 'K. Niedermann'.

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## Andrea Martina Aegerter

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# The Association Between Riders' Physical Fitness and Riding Performance: a Cross-Sectional Study

**Objectives:** Poor riding performance (RP) can be caused by medical issues of the horse and various factors such as inadequate equipment and deficiencies in the training schedule or intensity. The most neglected factor in current research is the physical fitness (PF) of the rider. The aim of this study was therefore to investigate the association between PF and RP.

**Methods:** 115 Swiss equestrians underwent a measurement of PF and RP. Seven domains of PF (balance, endurance, flexibility, reaction time, speed, strength, symmetry) were assessed by a physiotherapist. RP included the rating of a video recorded riding program by two national riding judges (RJ). The riders' demographics were collected using an online-survey. A linear model for RP that included the domains of PF and potential confounders was fitted to the data. Inter-rater reliability of the RJs was investigated by calculating the intraclass correlation coefficient. Significance level was set at  $p < 0.05$ .

**Results:** The endurance, strength, and symmetry were positively associated with RP, whereas flexibility was negatively associated. The model explained 19.1 % of variance in RP. The effects of the regression model and its coefficients were significant ( $p < 0.05$ ) with the exception of the symmetry. No association for RP was found for the balance, speed, and reaction time. The inter-rater reliability of RJ can be interpreted as "good" to "excellent".

**Conclusion** Findings suggest that PF is associated with RP. PF training should therefore be included in current training concepts. Future research should investigate whether similar conclusions could be drawn with regard to juniors and top athletes.

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## Cardiac Rehabilitation in Patients With Ventricular Assist Device in Switzerland - a Retrospective Data Analysis

**Introduction:** Ventricular assist devices (VAD) are increasingly implanted in patients with heart failure in Switzerland. Since 2007, these patients are regularly referred to cardiac rehabilitation (CR). The aim of this study was to describe the Swiss VAD-population, investigate those patients' changes in functional capacity (FC) and quality of life (QoL) during CR as well as explore associations between CR entry measures and outcomes (e.g. mortality).

**Methods:** Data on 206 patients (mean age 51; 79% male) with VAD-implantation between 01.01.2007 and 31.03.2017 at the Inselspital Berne or the UniversityHospital Zurich, with or without subsequent CR at the Berner Reha Zentrum Heiligenschwendi or the Zürcher RehaZentrum Wald was analysed retrospectively. Mortality, survival, support duration and heart transplantation rate were calculated. CR measures of FC (6MWD, FIM and Ergometry) as well as QoL (MNH and HADS) at entry and discharge were examined.

**Results:** On-device mortality after VAD-implantation within 30 days, one year and over the whole investigated period was 12%, 25% and 31%, respectively. At the end of follow-up, 19% still lived with the device and 50% had received heart transplantation. Median survival time was 30 (95% CI 18.73-41.28) months, with a mean support duration of 362 (95% CI 310.39-413.71) days. The patients who went to CR (58%) improved significantly in 6MWD (mean 114 ± 84.78 meters,  $p < 0.001$ ), Ergometry (mean 20 ± 16.54 Watt,  $p = 0.002$ ), FIM (median 6 points,  $p < 0.001$ ) and MNH (median 0.69 points,  $p < 0.001$ ), but not in HADS (median -1 point,  $p = 0.637$ ). Small to moderate significant correlations of 6MWD, FIM and HADS at entry with mortality, FIM at entry with LoS in CR, as well as FIM and MNH at entry with referral to acute care were found.

**Conclusion:** This study corroborates results from other VAD-studies concerning demographics and mortality. Patients improve FC and QoL during CR, but since this analysis had no control group, the progress cannot be attributed to CR. However, several studies showed positive effects of exercise on FC and QoL in VAD-patients. The remaining high values of HADS during CR should receive attention in clinical practice.

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# Accelerometry-Based Physical Activity, Disability and Quality of Life Before and After Lumbar Spine Surgery From a Physiotherapeutic Perspective: an Observational Cohort Study.

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**Background:** Severe lumbar radiculopathy is known to impair physical activity (PA). After surgical restoration, physiotherapy (PT) is a key in the patients' rehabilitation and has the potential to change their PA levels. Scientific knowledge on PA change after lumbar spine surgery (LSS) is needed for therapists to give high-quality advice for postoperative treatment and positively affect health by sufficient daily PA.

**Purpose:** The main goal was to compare PA measured as steps per day (SPD) before and after LSS to healthy people's lower bound of SPD (=7000).

Study design/setting. Single-centred prospective cohort study with assessments preoperative, 6 and 12 weeks postoperative.

**Methods:** 29 adults up to 75 years and subscribed for their first LSS were recruited and assessed between June 2017 and March 2018. Assessments were: Oswestry Disability Index (disability), Short Form 36 (HRQOL), visual-analogue-scaled back and leg pain, SPD count as well as moderate to vigorous PA (MVPA) recorded by the ActiGraph during three to seven days. Questionnaires were answered about the amount and content of attended PT. 26 datasets were analysed. Wilcoxon tests determined the difference of the sample's average SPD to 7000 SPD.

**Results:** Significant SPD count differences were found preoperatively (-1926;  $p = .001$ ), 6 weeks postoperatively (-868;  $p = .020$ ) and 12 weeks postoperatively (-1316;  $p = .004$ ). Six and 12 weeks after surgery, 60 to 70% more participants surpassed the threshold value of recommended MVPA minutes per day compared with preoperative data. Correlations in changes from preoperative to 6-week postoperative were for SPD with disability changes  $r = -.495$  ( $p = .010$ ) and for SPD with HRQOL changes  $r = .444$  ( $p = .023$ ). From 6 weeks to 12 weeks correlations were for SPD with disability changes  $r = .069$  ( $p = .739$ ) and for SPD with HRQOL changes  $r = -.138$  ( $p = .371$ ).

**Conclusions:** PA changes are insufficient to reach normal PA during the first 12 postoperative weeks and do not represent disability or HRQOL change. PA should demonstrate an additional outcome parameter in LSS patients and physiotherapists should emphasise PA effects and importance on health by promotion and training routine implementation.

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# Electromyography of Pelvic Floor Muscles With True Differential Versus Faux Differential Electrode Configuration: an Exploratory Study

**Aims:** In pelvic floor muscle (PFM) electromyography (EMG) two different bipolar configurations are applied for the assessment of neuromuscular activation. "True differential" configuration (TD) has two electrodes on each side the PFM intravaginal, measuring the left (TDl) and right (TDr) side separately. "Faux differential" configuration (FD) has only one electrode placed on each side of the PFM inside the vagina. The aim of the study was to determine the differences and the relationship of measuring the PFM by TD versus FD with a vaginal probe designed to measure both configurations simultaneously.

**Methods:** A secondary analysis of a sample of 28 continent (CON) and 22 slightly incontinent (SUI) women, where surface electromyography (EMG) was measured during maximal voluntary (MVC) and fast voluntary (FVC) contractions, was performed. TD and FD were explored with amplitude- (peak) and time-related (timepoint of peak, onset-differences) EMG parameters, cross-correlation coefficients (R(O)) and statistical parametric mapping (SPM).

**Results:** In a total of 62 comparisons of EMG parameters of MVC and FVC only one comparison in the CON group showed significant differences between TD and FD (FVC4peak TDl versus FD,  $p = 0.015$ ). R(O) were very high in both groups of CON and SUI and for all MVC and FVC variables ( $R(O) \geq 0.989$ ). SPM did detect four out of 28 comparisons with very short (0.001-0.143 sec.) significant supra-threshold clusters ( $p < 0.025$ ).

**Conclusions:** Very high cross-correlation coefficients and limited significant results from EMG parameters together with very short significant supra-threshold clusters from SPM suggest that TD and FD differ only randomly. It can be assumed that in the measured sample of CON and SUI women the choice of TD or FD remains practically irrelevant. Since the symptoms and muscle weakness of the SUI group were rather slight, the results might not be generalizable to the whole population of SUI. To gain further insights for the development of new probes, the comparisons should be re-evaluated on a sample with lower Oxford scores or higher ICIQ-UI-sf scores.

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# Intra-Rater Reliability and Construct Validity of a Core Strength-Endurance Assessment in People With Axial Spondyloarthritis

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**Objective:** To evaluate the intra-rater reliability and construct validity for an axial Spondyloarthritis (axSpA) adapted Core Strength-Endurance test battery (CSE) for the Swiss Ankylosing Spondylitis Association (SVMB) exercise groups.

**Methods:** Each participant in each group was tested at time point 1 (T1) and time point 2 (T2). At T1, participant characteristics, pain (NPRS), disease activity (BASDAI), functional restriction (BASFI), and physical fitness status (FFB-Mot.) were measured by self-report questionnaires and the (CSE) conducted. The intra-rater reliability was evaluated by calculating a Weighted Quadratic Kappa (K2) and the validity of all a priori-defined hypotheses were tested with one-tailed Spearman Correlations (rs).

**Results:** 62 axSpA affected participants (33 men, 29 women) mean age 55 (SD = 11.2) were recruited from the SVMB exercise groups.

Reliability calculations showed an acceptable Weighted Quadratic Kappa (K2) Value for all three planes (ventral plane (K2) = 0.653, 95% CI (0.479, 0.778); lateral plane (K2) = 0.610 95% CI (0.526, 0.694); and dorsal plane (K2) = 0.798 95% CI (0.726, 0.870)).

Correlation analysis (rs) confirmed in only three of the fifteen a priori defined hypotheses: CSE and pain (NPRS), CSE and disease activity (BASDAI), CSE and functional restriction (BASFI), and CSE with physical fitness status (FFB-Mot.).

**Conclusion:** The reliability analyses showed a substantial level of agreement. According to the Spearman correlations calculations, the validity of the CSE could not be confirmed. Therefore, the author suggests further investigating the CSE validity with a more costly yet already validated instrument to implement the CSE in the SVMB exercise groups.

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# The Effect of Leg Length Discrepancy on Spinal Kinematics During Gait

**Background:** Structural leg length discrepancy (LLD) is a common phenomenon. However, its effect on spinal gait kinematics remains unclear.

Research question: How does LLD affect spinal gait kinematics in patients with structural LLD and what is the immediate effect of a shoe lift?

**Methods:** Participants comprised 10 adolescents with structural LLD (20-60 mm) and 14 healthy controls, all of whom were fitted with a trunk marker set and requested to walk barefoot as well as with an orthotic shoe lift (only patients). Data were collected using a 12-camera motion capture system. Group comparisons were conducted using one-dimensional Statistical Parametric Mapping (SPM).

**Results:** Patients with LLD showed clinically relevant larger frontal plane lumbar bending angles to the longer side ( $p=0.007$ ), increased pelvic tilt to the shorter side ( $p<0.001$ ) and larger hip adduction angles on the longer leg ( $p<0.001$ ) compared to the healthy controls. In the sagittal plane, patients demonstrated changes in the knee (shorter leg) and ankle joint (longer leg). All gait deviations observed in patients with LLD could immediately be altered by correcting the LLD using a shoe lift.

**Significance:** As a reaction to the LLD, patients showed a lateral pelvic tilt towards the shorter side, which appeared to be compensated for by a lateral bending in the lumbar spine and a lateral shift of the pelvis towards the longer side. In addition, the use of an orthotic correction seems to be a suitable option to instantly normalize gait kinematics in patients with mild to moderate LLD.

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# Changes in the Motor Tasks Behaviour of the Pelvic Floor Muscles After Twelve Weeks of High Intensity Training With the Kieser-A5-Pelvicfloortrainer in Women With Mild Stress Urinary Incontinence. An Explorative and Feasibility Study

**Aims:** The aim of this study was to describe the changes of the pelvic floor muscle (PFM) motor task behaviour, the severity of stress urinary incontinence (SUI) difference after twelve-week high intensity training (HIT) with the Kieser-A5-Pelvicfloortrainer (A5) and its feasibility.

**Methods:** PFM motor task behaviour were assessed by the A5 in four different tasks. The 1 maximal effort task, the 10-maximal effort repetition task, a fatigue task and the realization accuracy of the training program. The severity of SUI was assessed by the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form questionnaire (ICIQ-UI-SF). Feasibility included the recruitment rate, the adherence and the drop-out rate.

**Results:** No statistical significant changes were found for the 1 maximal effort task ( $p=0.85$ ), the 10-maximal effort repetition task ( $p=0.29$ ) and the fatigue task ( $p=0.26$ ). Statistical significant were the improvements in the realization accuracy ( $p=0.012$ ) and ICIQ-UI-SF ( $p=0.043$ ). Recruitment rate was 26%, adherence to the training 70.8% and dropout rate 0%.

**Conclusion:** This study provides first data about changes of PFM motor task behaviour after a PFM HIT program on the A5. It indicates that women who are slightly affected by SUI can correctly contract the PFM after brief instruction. It further points out that improvement can be reached by this training program assessed by the ICIQ-UI-SF and the PFM motor task behaviour. Of course, it has to be considered that these results may have been biased by a missing control group and limitations of the measurement tool.

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## **Lower Back Pain and Its Relationship With Sitting Behaviour Among Seden- tary Office Workers of a Call Centre**

Sedentary behaviour as well as growing prevalence of low back pain (LBP) represent an increasing problem in modern society. However, several studies have shown that prolonged sitting itself has no causal relationship with LBP. Therefore, this study aimed to investigate different parameters of sitting behaviour in office workers with and without LBP to gain a deeper understanding of the relationship between LBP and occupational sitting habits. A textile pressure mat and two back pain questionnaires were used to evaluate sitting behaviour and acute as well as chronic LBP in 70 call centre employees. Main results indicate an association between sitting behaviour and chronic LBP affected participants, who demonstrated a more static sitting behaviour compared to pain-free office workers. Hence it can be assumed, that promoting dynamic sitting could be a beneficial factor in the prevention as well as management of chronic LBP. However this needs to be addressed in further studies.

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# Evaluation of Sport Specific Adaptations at the Shoulder Joint and Core Stability Among Elite Female Volleyball Players With and Without Overuse Related Shoulder Problems

**Background:** Shoulder problems are common in overhead athletes and associated with sport-specific adaptations in shoulder range of motion (ROM), muscle strength and scapular control. Yet published values outlining the differences between symptomatic (S) and non-symptomatic (nS) overhead athletes, and indicating the degree of risk for shoulder injuries, vary widely.

**Purpose/Hypothesis:** Symptomatic volleyball players would show greater adaptations such as glenohumeral internal rotation deficit (GIRD) and external rotation (ER) gain, alterations of total rotational motion (TROM), decreased strength ratio of external and internal rotators (ER/IR) caused by increased IR strength and ER strength deficit as well as scapular dyskinesia. In addition, core stability would be decreased in S players and associated with sport-specific adaptations at the shoulder.

**Study Design:** Cross-sectional study.

**Methods:** Sixty female volleyball players from the National Swiss Volleyball League were examined during the 2017/2018 season. Passive shoulder ROM in IR and ER, isometric strength of shoulder IR and ER, scapular control and core endurance were measured. Players were classified as S if they experienced current shoulder problems and the onset of their condition occurred slowly over time and/or suddenly. Side, group and subgroup comparisons of ROM, strength, scapular control and core endurance were made and correlations between core stability and ER strength deficit, strength ratio ER/IR and scapular dyskinesia were described.

**Results:** All players showed significant adaptations in ROM, strength and scapular control of their dominant shoulder (Ds). Players in the S subgroup had significantly weaker IR strength than nS players (mean difference, 7 N; 95% CI, 0.54 to 13.05;  $P \leq .034$ ;  $r = 0.295$ ) and tended to have ER strength deficit. In addition, the lower the ER strength deficit, the better the core endurance in the side plank position (Ds:  $r = 0.30$ ; 95% CI, 0.11 to 0.53;  $P \leq .035$ ).

**Conclusion:** Elite female volleyball players showed typical sport-specific adaptations at their Ds. The level of adaptations did not differ between S and nS players, except for those S players without previous shoulder surgery/pathology; they were weaker in IR strength.

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## Clinical Tests and Ultrasound Show Low to Moderate Diagnostic Test Accuracy for the Detection of Pincer and Cam Deformities in People With FAI Syndrome: a Systematic Review

**Background:** Femoroacetabular Impingement (FAI) syndrome is seen as a predisposing factor for degenerative processes in the hip joint. Recognition and adequate intervention is needed to reduce the risk of premature degeneration. Several clinical tests for the diagnosis of FAI morphologies are proposed, but there is a lack of an actual systematic overview of the current literature about the accuracy of these tests.

**Objectives:** To examine the diagnostic accuracy of clinical tests and Ultrasound for pincer, cam or mixed type deformities, and discussing the clinical utility of these tests.

**Methods:** A systematic search of MEDLINE via PubMed, CINAHL, EMBASE and SPORTDiscus databases was conducted. Due to the small number of included studies, a meta-analysis was not performed and results were analysed in a descriptive manner. Changes of pre-test probabilities depending on varying prevalence were presented. A test combination was proposed based on available LR and the use of a Fagan Nomogram.

**Results:** Eight studies were included, investigating 19 clinical tests. Overall results showed a low specificity for all tests, ranging from 0.11 to 0.44. Sensitivity was moderate for pain provocation tests and imaging per Ultrasound, ranging from 0.56 to 1.00. A combination of four selected tests with a negative test result showed a negative LR of 0.12.

**Discussion:** The current literature indicates that clinical tests are not appropriate to rule in a cam or pincer deformity, but pain provocation tests and Ultrasound can potentially be used to rule out a diagnosis of FAI deformity with a negative test result.

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# The Lumbar-Spine-Instability Questionnaire: Translation Into German, Cross-Cultural Adaptation and Reliability Assessment

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**Background:** Chronic Low Back Pain (LBP) represents one of the leading causes of disability. Subgrouping people with LBP is an important strategy to improve management. Lumbar Spine Instability (LSI) is considered to be one of these subgroups. Insufficient methods for the classification of LSI means LSI has become a controversial diagnosis. Diagnosing LSI as a structural and biomechanical problem has failed. Subjective complaints as well as self-perception of instability may play an important role in the identification of LSI. The Lumbar Spine Instability Questionnaire (LSIQ), a self-reported questionnaire, may help diagnose LSI. A German version of the LSIQ does not currently exist. This study translated and crossculturally adapted the LSIQ into German, and assessed the internal consistency and reproducibility of the adapted questionnaire.

**Methods:** This study was conducted in two parts. In the first part, the LSIQ was translated and adapted into German (LSIQ\_G). Translation and adaptation of the LSIQ\_G was completed following the international guidelines. In the second part, the internal consistency of the LSIQ\_G was evaluated at baseline, and the test-retest reliability was evaluated in a time-frame between seven and 14 days.

**Results:** The LSIQ\_G shows good test-retest reliability (ICC=0.69) and agreement measurements (SEM=1.69 and MDC=4.68). However, internal consistency was low (Cronbach's alpha=0.43).

**Conclusion:** The LSIQ\_G was successfully translated and can be used in all German speaking countries. It showed good Reproducibility and Agreement parameters. However, low internal consistency suggest that more research is necessary to understand what the LSIQ is really measuring and if it could be an appropriate tool to identify people affected by LSI.

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# Changes in the Activation Pattern of the Transversus Abdominis Muscle After Non-Invasive Pelvic Floor Muscle Training in Women With Mild Stress Urinary Incontinence. A Feasibility Study

**Aims:** The purpose was to determine the feasibility of non-invasive high intensity pelvic floor muscle training (PFMT) and to investigate any changes in activation pattern of the transversus abdominis muscle (TrA) in women with mild stress urinary incontinence (SUI).

**Methods:** Twenty women, aged 40 to 61 years, with mild SUI participated. To evaluate the feasibility, three criteria were defined: the recruitment rate, the adherence and the changes in SUI symptoms. The TrA activation was measured through a rehabilitative ultrasound imaging (RUSI) protocol in response to the non-invasive 12 week PFMT.

**Results:** The evaluation showed a recruitment rate of 29%. On average 17 of 24 trainings were completed with the equipment. Two participants were unable to complete the training and counted as drop-outs. The RUSI score exhibited no statistically significant change ( $p=0.092$ ). Of the maximal 50 points possible, average scores of 27.20 at baseline and 30.44 were reached at final assessment. As single tests of the RUSI protocol, expiration ( $p=0.041$ ) and draw-in manoeuvre ( $p=0.046$ ) each showed statistical significant differences.

**Conclusions:** Our findings provide initial data to use the A5 training as a non-invasive standardized PFMT to treat women with mild SUI. Although the change in the TrA activation pattern was not statistically significant, our data does implicate clinical importance to involve PFMT in TrA rehabilitation. To approve these initial data, validity studies of the RUSI protocol and studies with a control group have to be conducted.

### Betreuungsperson

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# Effects of Outpatient Cardiac Rehabilitation on Physiological Performance: a Retrospective Subgroup Analysis by Gender and Age

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**Purpose:** The aim of this study was to determine whether age and sex have an influence on the effectiveness of outpatient cardiac rehabilitation. We also identified and analyzed various predictors for the effectiveness of cardiac rehabilitation.

**Methods:** All patients who commenced a three-month outpatient cardiac rehabilitation programme at the Inselspital, Berne, between 01.01.2015 and 31.12.2017 and who met the inclusion criteria were included in the study. Maximum performance was recorded at the beginning and end of the rehabilitation programme by ergometric testing. The metabolic equivalent (MET) was calculated from these measurements. The influence of the predictors sex, age, adherence, cardiac risk factors and comorbidities on performance changes was determined by stepwise linear regression with backward elimination.

**Results:** The older patients (> 65 years, N = 220) and women (N = 127) improved significantly less at 0.7 respectively 0.6 METS than the younger patients (< 65 years, N = 427) and men (N = 520) who improved by 1 MET. Diabetics and patients with chronic renal insufficiency also improved significantly less at 0.5 METS than patients without these disorders.

**Conclusion:** The results show that female and older patients experience less improvement in their performance. Diabetes mellitus, chronic renal insufficiency and smoking also have a negative effect on performance improvement. These patients achieved lower levels of performance at the start of the cardiac rehabilitation programme and would benefit the most from it. For this reason, future studies should investigate how and whether rehabilitation programmes for these groups can be optimized.

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# Investigation of the Pelvic Floor Activity During Singing. An Explorative Study to Assess Pelvic Floor Activity in Professional Singers with Transabdominal Ultrasound

**Aims:** Intraabdominal pressure, abdominal muscles and respiration are strongly linked with the pelvic floor muscle (PFM) activity. The professional singers of University of the Arts in Zurich learn to apply different positions to get activated the pelvic floor during their formation. The objective of this study is to investigate if there exist a correlation between involuntary PFM activation in different positions (lying and standing) in professional singers. This study explored the PFM activity in different positions and the subjective perceived fatigue and PFM activation during singing tasks with Transabdominal Ultrasound (TAUS). The role of PFM during singing is not explored yet.

**Methods:** Nineteen singers (13 female, 6 male, aged from 19-50 years mean 30 ±SD 8.3) were recruited for the study. They were assessed in two different positions in standing and two positions in crook lying with TAUS. Every task was assessed three times. The bladder lifting of each video of every task was examined by two physiotherapists independently and calculated.

**Results:** A higher PFM activity was observed in the positions with supplementary isometric external rotation of the hips. The subjective perceived fatigue during singing was higher in the group with PFM activation.

**Conclusion:** The results show a higher activity of PFM in determinant positions. The complexity of PFM activity and perceived fatigue during singing is not yet completely understood. TAUS is an excellent tool to assess concentric PFM activity. More research is needed to investigate not invasively isometric and eccentric PFM activity in functional tasks and during singing.

### Betreuungsperson

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# A Systematic Review on the Effects of High Frequency Chest Wall Compression and Intrapulmonary Percussive Ventilation in Patients With Neuromuscular Disease

**Background:** Respiratory insufficiency is the most common cause of mortality among patients with a neuromuscular disease (NMD).

**Objective:** This review aims to evaluate if the lung capacity can be stabilised using high frequency chest wall compression (HFCWC) or intrapulmonary percussive ventilation (IPV). We assessed the effect of these interventions compared to standard care or no treatment on the quality of life (QoL) of patients with NMD during respiratory infections or stable periods.

**Study eligibility criteria:** We included randomised controlled trials, clinical trials, retrospective chart review, cross-over studies and cohort studies which evaluated HFCWC or IPV in adults or children with NMD with or without tracheotomy.

**Methods:** We conducted a systematic review (ID number: CRD42017064703). The electronic search was on Embase, MEDLINE, CINAHL, CENTRAL and PEDro. From 2,917 records, we included seven articles. The results are presented narratively.

**Results:** No significant difference in the lung functions was observed between groups, neither with HFCWC nor with IPV compared to control group. No significant difference in the QoL was perceived with HFCWC compared to a control group.

**Conclusions:** Articles had only very low-quality evidence and reported outcomes had a high risk of bias. Considering the small number of studies with low statistical power, it is not possible to recommend the use of the HFCWC or the IPV to stabilise the lung function in patients with NMD or to improve their QoL. Further research is needed before we can make any final conclusion.

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## Influence of Different Training Modalities on the Neuronal Growth Factor BDNF and on Cognition and Motor Function – a Feasibility Study

**Background:** The brain-derived neurotrophic factor (BDNF) belongs to the neurotrophins. These are neuronal growth factors involved in processes such as the long-term formation, differentiation and survival of certain neuron populations, as well as the short-term synaptic increase in activity. After aerobic training BDNF is distributed more often. In addition, improvements in both cognitive and motor skills were demonstrated in healthy volunteers after aerobic training (Ferris, Williams, & Shen, 2007; Snow et al., 2016). It is still unclear which training modalities influence BDNF release and cognitive and motor skills most favourably. A feasibility study will examine this and check the feasibility. The aim is to create important foundations for a large study of chronic stroke patients.

**Goals:** Primary results included feasibility criteria such as acquisition and evaluation of cognitive and motor tests, correct preanalytical sample preparation, timely laboratory analysis and the adherence of test subjects. Secondary, the change in BDNF blood serum concentration over time and that of cognitive and motor performance was examined according to different training modalities.

**Methods:** In a randomized, controlled trial arrangement, an availability sample of seven healthy individuals was tested. Feasibility parameters were set based on the primary objectives and were regarded as fulfilled at a quota of  $\geq 95\%$ . Before and after a maximum performance test, aerobic endurance training and anaerobic training, blood samples were taken at predefined times and cognitive and motor performance tests were performed.

**Results:** The proportion of planned to effectively generated blood samples or blood serum samples reached 97% and 96%, respectively. The proportion of laboratory samples analyzed later within three months of blood collection was 85%. The data sets of the cognitive and motorical tests were 96.5 % complete. The drop-out rate was 5%. The comparability of the laboratory results was partly given. Changes in the blood serum concentration of BDNF as well as changes in cognitive and motor performance under the influence of different training modalities mostly remained at a non-significant level.

**Conclusion:** The feasibility could be assessed as "feasible with adjustments". The protocol must be adapted for further work.

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# Shared Decision-Making in Physical Therapy: a Cross-Sectional Observational Study

Co-Autoren

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**Background:** Shared decision-making (SDM) reduces the unbalanced power between physical therapists and patients and improves patients' satisfaction and health outcomes.

**Objectives:** The objectives of this study were to detect physical therapists' SDM behaviour in different settings, to determine agreement between patients' preferred levels of involvement in SDM and therapists' perceptions of patients' preferences, and to examine predictors of SDM behaviour.

**Design:** Cross-sectional observational study.

**Methods:** Thirty physical therapy consultations were audio recorded and analysed in respect to SDM behaviour by using the OPTION instrument. The control preference scale (CPS) measured patients' preferred levels of involvement in the SDM process and therapists' perceptions of patients' preferences. SDM behaviour was analysed using descriptive statistics. The Mann-Whitney U test showed differences between therapy settings and between physical therapists' education levels. Predictors of SDM behaviour were analysed by a multivariate regression.

**Results:** The OPTION instrument showed a median of 50.50 (44.00, 66.00) out of 100. A significant group difference was found between therapy settings ( $Z = -3.666$ ,  $P = 0.000$ ) and between education levels ( $Z = -2.018$ ,  $P = 0.044$ ) regarding SDM behaviour. Agreement between patients and physical therapists regarding involvement level was poor at weighted kappa of  $-0.261$  (95% CI  $-0.514$  to  $-0.007$ ). In 50% of the observations, patients wanted to be more involved than physical therapists perceived. Therapy settings, education levels and the interaction of education and work experience predicted SDM behaviour ( $b = 15.760$ ,  $P = 0.000$ ;  $b = 8.045$ ,  $P = 0.048$ ;  $b = -0.328$ ,  $P = 0.016$ ).

**Limitations:** Is questionable, this study included only one rehabilitation and one private practice.

**Conclusion:** SDM behaviour was of good standard. Education was the main predictor for good SDM behaviour. Further research is required regarding the relationship between education and communication skills.

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# Pain and Functional Limitation Among Rural Gambian Female Head-Load Bearers

**Background:** Head-load bearing is a common practice among female Gambians. From a health perspective, questions arise of how long-term head-load bearing affects the carrier's health. A case control study from Nigeria found that 89% load carriers had degenerative changes in the cervical spine. No study has looked at neck pain and functional limitation among head-load bearers so far.

**Objectives:** The aim of this study is to explore the relation between musculoskeletal disorders, pain and functional limitations of the neck amongst rural female head-load bearers in The Gambia. Associations between range of motion (ROM), proprioception and head-load bearing characteristics such as weight, distance etc. were examined.

**Methods:** A cross-sectional study in rural Gambia was conducted. Neck functions were measured such as ROM and proprioception (tested as joint position error (JPE)). A survey questionnaire was used to get characteristics in relation to their head-load bearing such as weight, distance etc. The pain intensity was measured by the numeric rating scale (NRS) and functional limitation by the patient specific functional scale (PSFS). A regression analysis was executed to assess if independent variables can predict NRS and PSFS.

**Results:** 39 women participated. The multiple regression analysis reported, that head-load bearing, especially the weight carried, ROM and proprioception could explain pain intensity and functional limitation variance with an adjusted R-square of 0.25 and 0.36 respectively.

**Conclusions:** This study showed that head-load characteristics, ROM and proprioception can significantly explain neck pain and functional limitation. Women with more pain intensity and functional limitation bear less weight.

Betreuungsperson

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# Psychometric Evidence of the WORQ – an ICF-Based Questionnaire in Vocational Rehabilitation

Co-Autoren/Co-Autorin

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**Background:** The prevalence of musculoskeletal disorders producing long-term sick leave from work has increased in industrial countries. Physiotherapists (PT), are specialists who can help to restore people's functional ability. A patient-reported-outcome measure (PROM), such as the Work Rehabilitation Questionnaire (WORQ) that captures work related functioning could effectively support the work of these PTs. There is currently no reliable and valid patient-reported-outcome (PRO) to capture work functioning. The aim of this study was to assess the psychometric properties of the German version of the Work Rehabilitation Questionnaire (WORQ) and its clinical subscores in patients with musculoskeletal disorders in a private setting of a physiotherapy practice.

**Methods:** For the evaluation of the test-retest reliability we have employed WORQ twice in a sample of 51 patients with restricted work participation. In order to test the construct validity of WORQ we have administered questionnaires that evaluated similar concepts along with WORQ at time point one (T1). Internal consistency and feasibility were assessed in a sample of 80 patients.

**Results:** Because the data was not normally distributed, median (ma) and range (RA) of WORQ sum score at T1 (ma: 79, RA: 261) and T2 (ma: 58, RA: 249) were to be tested with the nonparametric Wilcoxon Test ( $p=0.001$ ). A Spearman correlation ( $n = 51$ ) of WORQ sum score at T1 and T2 resulted in  $\rho=0.794$ ,  $p=0.01$ . Furthermore, internal consistency of WORQ showed a Cronbach's alpha = 0.941 for all 40 items. WORQ demonstrated positive ratings for Face validity and Content validity. For Construct validity, Spearman correlations were used to check on a priori predictions. Regarding to the aspect of feasibility, WORQ gets reasonable quantitative and qualitative feedbacks from patients and health professionals.

**Conclusions:** WORQ is a reliable and valid instrument for measuring work functioning in patients with musculoskeletal disorders resulting in a restricted work participation. Moreover, WORQ is easy to handle for health professionals and for patients. The additional information gained when using WORQ in a private physiotherapy practice setting would improve interdisciplinary understanding of the patient's situation and their environment. However, further studies are required to examine its use in vocational rehabilitation.

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# Physical Fitness Before and After Lung Transplantation: a Longitudinal Observational Study

**Introduction:** Physical rehabilitation starts immediately after lung transplantation (LTx) and requests specialized therapeutic procedures. There is a lack of data describing longitudinal changes in physical fitness post-LTx. The aim of this master thesis was to evaluate physical fitness before and after LTx using the 1-minute sit-to-stand test (1MSTS), 6-minute walk test (6MWT), muscle force (MF) and handgrip strength (HS).

**Methods and measurements:** 79 patients evaluated for LTx and those who already underwent LTx were assessed at baseline. Data from three measurement timepoints including post-LTx outpatient physiotherapy were collected during standard clinical practice from June 2015 to February 2018. Descriptive analyses presenting individual changes over time were graphically displayed. A focus group interview with the physiotherapists who performed the tests was performed after February 2018.

**Results:** All patients showed performance below reference values at baseline in 1MSTS and 6MWT. MF and HS showed a highly variable picture at baseline. After rehabilitation, clinically relevant improvements were shown in 3 patients in 1MSTS, 9 in 6MWT, 6 in MF and 3 in HS. A high amount of missing data in all outcomes was observed.

**Discussion:** Only moderate changes during the rehabilitation period were observed in all outcomes, indicating modestly effective rehabilitation or high impact of contextual factors. Likely reasons are the low training frequency and contextual factors. The physiotherapists acknowledged short therapy sessions and a high workload as main reasons for missing data. According to these findings, process control was extended with lengthening of therapy sessions and a new process leading role.

### Betreuungsperson

Thomas Radtke, PhD

# The Effect of Movement and Loading on Clinical and Radiological Outcomes After Autologous Chondrocyte Implantation in the Knee, a Systematic Literature Review

Co-Autoren/Co-Autorin

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**Study design:** Systematic literature review

**Objectives:** To collect evidence in the current literature about impact of movement and loading on clinical and radiological outcome after autologous chondrocyte implantation (ACI) in the knee joint.

**Background:** Joint movement and loading are considered to be important mechanical stimuli after autologous chondrocytes implantation. Preclinical studies suggest positive effects of increased movement and loading on repair tissue formation. Clinical importance of these observations is not yet clear.

**Methods:** A systematic literature search was performed in the online databases PubMed, Cochrane, Embase, PEDro and OpenGrey.

**Results:** 12 articles as full text, including 8 randomized controlled trials (RCT), 3 cohort studies and 1 case series fulfilled the predetermined eligibility criteria. 3 high quality RCT's, containing 136 patients show for 3rd generation ACI on the femoral condyle, full weightbearing can safely be achieved within 6 – 8 weeks. 3 Cohort studies with moderate risk of bias could show: Superior 2-year follow-up results in the group with high amount of low load activities like cycling within the first 3-month post-surgery or that physically active people improve until the 3-year follow-up and high pivoting activities before 12-month post-surgery may lead to minor results.

**Conclusion:** Extensive movement within at least the first 2 years after surgery and a slow increase of loading in terms of high impact, high pivoting activities not before 12 months post-surgery lead to the best results.

Betreuungsperson

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## Rehabilitation in Multiple Sclerosis: Sometimes Too Much? Changes in Perceived Fatigue and Step Counts in People With MS Before and After Rehabilitation in Valens. An Observational Study.

**Objective:** Physiotherapists in the ambulatory setting complain that people with Multiple Sclerosis (pwMS) are fatigued and over-trained after rehabilitation. The aim of this study is to evaluate changes in fatigue, step counts and depression in pwMS, assessed at three different points in time.

**Methods :** This is a prospective, single-center, observational study with assessments before and after rehabilitation, as well as two month follow-up. Fatigue and depression were assessed by questionnaires, step counts by Actigraph GT3X accelerometers (worn 7 days).

**Results:** A total of 24 participants with walking impairment (EDSS 3-6.5) were included. Step counts before rehabilitation (mean=58'981, wear-time 33-73%), after rehabilitation (mean=55'135, wear-time 22-73%) and at two month follow-up (mean=56'545, weartime 35-68%) did not significantly change. Mean changes in step counts were -2.29% after rehabilitation and -3.17% at follow-up. Compared to baseline fatigue was significantly reduced after rehabilitation ( $p=0.011$ ) and at follow-up ( $p=0.018$ ). Participants showed significantly less depressive symptoms after rehabilitation ( $p=0.003$ ) and at follow-up ( $p=0.014$ ).

**Conclusion:** Our study suggests that rehabilitation has beneficial effects for pwMS as they exhibited a smaller number of symptoms related to fatigue and depression. Furthermore, step counts remained constant. In conclusion, the intensity and frequency of rehabilitation chosen in Valens is appropriate for this population.

Betreuungsperson

Jan Kool, PhD

# Evaluation of Peak Shear Forces at the Tibiofemoral Joint During Eccentric Braking on a Spinning Bike: an Exploratory Pilot Study With Healthy Participants

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**Background/Objective:** The understanding of joint loads during rehabilitation exercises is crucial to sustain the clinician's evidence based decision making. However, previous literature lacked to investigate shear components during eccentric braking on a spinning bike, although its use has been frequently observed during rehabilitation in clinic. The objective was therefore to evaluate the extend of tibiofemoral shear forces during eccentric braking on a spinning bicycle, and compare the values to steady-state cycling and other activities of daily living.

**Method:** 20 participants were measured in vivo regarding tibiofemoral shear forces during steady-state cycling (freewheel bicycle) and eccentric braking (spinning bicycle) on 60-100rpm. Therefore, two force plate pedals were combined with the VICON camera system for the assessment. Data were computed in MatLab by means of trigonometric procedures. For ADL comparison data were used from previous literature.

**Results:** All shear components during eccentric braking differed significantly from those occurring during steady-state cycling. Largest mean difference was reported 46.9% for 90rpm (Spinning-bike:  $-477.88 \pm 172.7\text{N}$ ; Freewheel:  $-253.99 \pm 76\text{N}$ ). Furthermore, single peak shear forces during eccentric braking created a rather large force impact compared to those during activities of daily living (Braking:  $-1194\text{N}$ ; Sitting down/up:  $-451\text{N}$ ; Declining stairs:  $-334\text{N}$ ; Inclining stairs:  $-314\text{N}$ ; Walking:  $-255\text{N}$ ).

**Discussion/Conclusion:** Though standard deviations were relatively large, the outcomes indicate considerably high peak shear components during eccentric braking as well as in comparison to those occurring during activities of daily living. The results thus support the hypothesis that cycling on a spinning bike should be considered with caution during rehabilitation of the lower limb.

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## Training in Adult Patients With COPD: a Systematic Review and Meta-Analysis

**Objective:** To identify the relative effects of different training modalities on quality of life and functional capacity in male and female adult patients with COPD as well as to rank the effectiveness of the different training modalities of endurance, resistance training and combined resistance plus endurance training.

**Methods and data sources:** In this systematic review and meta-analysis, studies were searched in the databases of Pubmed, Cochrane Central, CINAHL, Medline and Embase. The statistical analyses were performed with the help of R-Studio.

**Results:** The initially intended network meta-analysis could not be performed due to substantial inconsistency of the screened studies. Therefore, a pairwise meta-analysis has been conducted and reported if pooling of the data was possible. Only 8 meta-analyses were possible, due to the low quality of data available.

High intensity interval training compared with aerobic training did not show any difference in terms of quality of life for adult patients with COPD ( $k=2$ ;  $n=101$ ;  $SMD=0.17$ ,  $95\%CI$ : -0.23 to 0.56) neither did resistance training on the whole vibration platform ( $k=2$ ;  $n=123$ ;  $SMD=0.09$ ,  $95\%CI$ : -0.26 to 0.44).

The results for functional capacity are similar: High intensity interval training does not show any differences compared with aerobic training ( $k=2$ ;  $n=101$ ;  $SMD=0.08$ ;  $95\%CI$ : -0.71 to 0.86), neither does sprint interval training compared with aerobic training ( $k=2$ ;  $n=128$ ,  $SMD=0.26$ ;  $95\%CI$ : -0.20 to 0.72), nor inspiratory muscle training (IMT) compared with sham IMT therapy ( $k=2$ ;  $n=109$ ;  $SMD=0.53$ ;  $95\%CI$ : -0.72 to 1.79). There are also no differences between resistance training compared with resistance training on a body vibration platform ( $k=3$ ;  $n=197$ ;  $SMD=0.21$ ,  $95\%CI$ : -0.39 to 0.8), as well as no differences between resistance training compared with no training ( $k=2$ ;  $n=104$ ;  $SMD=0.41$ ,  $95\%CI$ : -0.67 to 1.49). Nevertheless, aerobic training is better compared to no training for patients with COPD ( $k=2$ ;  $n=105$ ;  $SMD=-0.76$ ;  $95\%CI$ : -1.15 to -0.36).

**Conclusion:** The initial research question could not be answered. We can state, that endurance training in patients with COPD is better than no training. In order to be able to answer the research questions with respect of the above-mentioned outcomes, it is important to carry out high methodological quality studies with a sufficiently large number of participants.

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## Cost-Effectiveness of Stratification Management Versus Current Best Practice in Adults With Non-Specific Low Back Pain: Systematic Review and Meta-Analysis

**Objectives:** Non-specific low back pain produces pain, functional impairments and substantial costs. It is therefore a burdensome condition for the healthcare system and the society. With the aim of improving outcomes, several approaches exist to classify low back pain patients into subgroups and adapt the treatment procedures. The aim of this systematic review was to assess the effectiveness of stratification approaches in patients with non-specific low back pain. Furthermore, it will be assessed how cost-effective are treatments due to a stratification management.

**Methods:** PubMed, PEDro, CENTRAL, Embase, CINAHL and NHS EED were searched from May to December 2017. The study quality was assessed by means of the Cochrane RoB2.0 and the Drummond Checklist. The main outcomes were disability and health related quality of life. A random-effects meta-analysis was performed. Sensitivity analyses were conducted for risk of bias and study size. For the description of the costs a narrative synthesis was performed.

**Results:** Finally, a total of 16 studies were included in the review and meta-analysis. There was a small but significant effect for disability (SMD of -0.21 (95 % CI -0.36 to -0.05)) and a very small but not significant effect for health related quality of life (SMD of -0.05 (95 % CI -0.24 to 0.13)). Of the 16 studies 4 were economic studies, 3 of them in good methodological quality.

**Conclusions:** There exist many stratification approaches and not enough evidence for one of them. Based on only two studies there could be a potential evidence about the cost-effectiveness of a stratification approach.

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# Feasibility of High-Intensity Interval Training Through Exergaming and Its Effects on Cardiovascular Fitness in Healthy Older Participants

**Background:** Despite the overwhelming evidence for major beneficial effects of exercise on health, most older adults show insufficient levels of daily physical activity. Exergames provide potentially attractive means to facilitate physical activity in an appealing ambience. High-intensity interval training (HIIT) is an effective way to improve exercise capacity as well as metabolic and cardiovascular health, yet the feasibility to perform HIIT using exergames is unclear. This study assessed the feasibility of HIIT using exergames and its effects on cardiovascular fitness in healthy older adults.

**Methods:** Twelve healthy elderly participants (mean age 72.3 years) performed a four-week high-intensity interval exergame intervention with twelve training sessions. Feasibility outcomes included adherence, attrition, perceived usefulness and measures of training intensity and time. The secondary outcomes focused on cardiovascular fitness, involving an incremental maximal exercise test to evaluate maximum heart rate (HR-max) and workload as well as heart rate variability measurements.

**Results:** Eleven participants completed the study (8.3 percent attrition) without any adverse events. Compliance with participation in the study was 90.9 percent and participants showed high acceptance of the intervention with Technology Assessment Model Questionnaire (TAM) scores between 5.8 and 6.7. User satisfaction was rated as excellent (System Usability Scale overall score 93.5). 86 percent of high-intensity intervals met the targeted intensity range while the participants accomplished the targeted exercise times during 98 percent of cases. 36 percent of the recovery periods were completed with a heart rate above the target range of HRmax. Maximum workload (W) during the incremental exercise test post-training increased significantly compared to the baseline assessments one and two ( $p=0.032$ , effect size  $r=0.77$  and  $p=0.012$ ,  $r=0.87$ ).

**Conclusions:** The results indicate that a high-intensity interval training through exergaming is feasible, safe and shows high satisfaction in healthy older adults. This corroborates previous findings in showing that virtual reality-based approaches for performing endurance training are perceived as usable and have great potential. Specifically, this study shows that HIIT using exergames has a positive effect on maximum power output on an incremental exercise test and other positive trends shown warrant future studies in older adults.

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## Inter- and Intrarater Reliability of a Hip Examination Test for Determining the Position of the Femur Within the Acetabulum in Middle-Aged People

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**Background:** Manual therapy after Sohler is a concept used to treat patients with hip osteoarthritis (OA). Despite the application in clinical practice there is no evidence concerning inter- and intrarater reliability of the hip examination tests used by Sohler therapists.

**Objective:** To estimate inter- and intrarater reliability of the femur acetabulum positioning test (FAPT), a manual hip examination test of the Sohler concept assessing the position of the femur within the acetabulum in middle aged people.

**Design:** Repeated measurement with two raters.

**Methods:** Twenty-seven healthy persons aged between 40 and 70 years were recruited. Two physical therapists performed passive manual movements for evaluating the deviation of the femur within the acetabulum. Cohens' kappa for nominal data and weighted kappa for ordinal data were computed.

**Results:** Kappa values for simple prevalence of anteversion, ante-position, impulsive and expulsive were -0.08 (95%CI: [-0.33;0.20]), 0.32 (95%CI: [0.05;0.57]), 0.07 (95%CI: [-0.27;0.37]) and 0.09 (95%CI: [-0.26;0.28]), respectively. Intrarater reliability ranged from  $\kappa = 0.21$  to 0.64. Weighted kappa for anteversion, ante-position, impulsive and expulsive were -0.07 (95%CI: [-0.28;0.14]), 0.18 (95%CI: [0.00;0.35]), 0.06 (95%CI: [-0.17;0.29]) and 0.12 (95%CI: [-0.18;0.41]).

**Conclusion:** The FAPT provides insufficient intra- and interrater reliability. Future research needs to focus on standardization and an improved defined threshold. The introduced grading system from zero to four has the potential to provide clinicians and scientists with valuable information about therapy progress and minimal detectable difference.

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# Wie beurteilen Schweizer Physiotherapeuten und Physiotherapeutinnen die Physiotherapie 2.0 und den Patient 3.0 in der Praxis? Eine qualitative Studie mit phänomenologischem Ansatz

**Hintergrund:** Die Digitalisierung der Gesellschaft bringt auch im Gesundheitswesen grosse Veränderungen mit sich. Diese Veränderungen tangieren somit auch den Berufsstand Physiotherapie. Das Internet hat den Zugang zu gesundheitsbezogenen Informationen vereinfacht und kann für Patienten eine wichtige Quelle sein. Zudem nehmen soziale Medien eine immer wichtigere Rolle als Informationsquelle ein und können Auswirkungen auf das Empowerment von Patienten haben. Es ist also durchaus vorstellbar, dass Patienten in der Physiotherapie diese digitalen und web-basierten Informationsquellen nutzen, um sich über ihre Krankheit und deren Verlauf zu informieren. Es stellt sich allerdings die Frage, wie Schweizer Physiotherapeuten und Physiotherapeutinnen über diese Entwicklung denken und inwiefern sie digitale Medien in ihre Arbeit miteinbeziehen.

**Methode:** Im Raum Basel wurden 15 Physiotherapeuten und Physiotherapeutinnen aus verschiedenen Kliniken und in unterschiedlichen beruflichen Positionen interviewt. Die Erhebung der Daten erfolgte mittels semi-strukturierter Interviews mit offenen Fragen. Die Audiospuren wurden in Mundart und mithilfe der Software «F5 Transcription» verbatim transkribiert und anschliessend anhand einer thematischen Analyse ausgewertet.

**Resultate:** Insgesamt wurden an vier Institutionen 15 Interviews mit Physiotherapeuten und Physiotherapeutinnen im Raum Basel durchgeführt. 1368 Textpassagen wurden extrahiert und codiert, in 48 Kategorien eingeteilt, um daraus fünf Themen zu generieren: Patientenbedürfnis nach Gesundheitsinformationen, Rollenverteilung in der Therapie, Auswirkungen von Patient 3.0 in der Praxistätigkeit, Onlineinformationen und deren Einfluss auf die Interaktion sowie technologische Fortschritte in der Therapie.

**Schlussfolgerung:** Zusammenfassend lässt sich sagen, dass die Entwicklung der Patienten nicht beeinflusst werden kann, in der Therapie aber als positiver Faktor gesehen werden sollte. Durch den Einbezug und den offenen Umgang mit vorab informierten können beide Parteien im therapeutischen Setting profitieren. Zudem bedarf es Ausbildungsmöglichkeiten für Therapeuten in Bezug auf Technologisierung. Es bedarf aber weiterer Studien, die den Umgang und die Implementierung von neuen Technologien in der Schweizer Physiotherapie untersuchen.

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# A Comparison of EMG Hamstring Activity During Stair Descent and Artificially Induced Tibia Perturbation After ACL-Rupture at One-Year Follow-Up

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**Introduction:** Injury of the anterior cruciate ligament (ACL) very often is a sports career ending injury with consequences for the passive and active stability of the knee joint. Up to three years after injury alterations in strength, neuromuscular control and functional performance persist. Alterations in hamstrings activity and stretch reflex excitability due to the ACL-rupture are associated with “giving way” episodes. This study gives further insight on the restoration in changes of hamstrings reflexes and muscle activity during stair descent and artificially induced tibia translation.

**Methods:** Nine participants with isolated ACL-rupture were measured three weeks after injury and one year later. Firstly, they had to ascend and descend a six-step stairway and in a second task stretch reflexes were elicited by artificially induced tibia translation in standing position. Electromyographic activity of the biceps femoris (BF) and the semitendinosus (ST) was recorded and normalised root mean square values were calculated in four timeframes.

**Results:** Neuromuscular activity of the hamstrings revealed statistically significant differences between the participants' injured and intact knee at baseline and follow-up. Reflex activity in ST was found to be 27-41% higher in participants' deficient knee at baseline. No differences were found in BF and ST activity in any timeframe comparing baseline with follow-up.

**Discussion:** Altered reflex activity of the hamstrings directly after injury and one year later in the injured knee were found. In one year of rehabilitation BF and ST activity did not change significantly in our sample in stair descent or stretch reflex measurement. This is in line with most authors who report on neuromuscular activity after ACL-rupture. At return-to-sports threshold of 9 months only a small number of patients reach sufficient strength symmetry and functional stability restoration. This results in a high number of second ACL-injuries.

**Conclusion:** The differences in reflex activity found in ACL-deficient patients cannot be restored in one year of rehabilitation. Since neuromuscular training has proven to enhance reflex activity and functional stability of the knee, results of this pilot study underline the special importance of neuromuscular training contents in ACL rehabilitation.

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# The Impact of Patient-Physiotherapist Interaction on Home Exercise Adherence: A Qualitative Approach

Adherence to recommendations and exercise programs is one of the most important foundations for the effectiveness of physiotherapeutic interventions. Today, it is also known that the relationship between patients and physiotherapists as well as their communication skills can have an effect on adherence and thus on therapeutic success. However, to date, we do not know how the patients and their physiotherapists collaborate during the instruction and execution of a home exercise program and how home exercise adherence is discussed in physiotherapy follow up sessions. The aim of this study was to increase our understanding of the role that patient-physiotherapist interaction plays for adherence to home exercise programs.

**Methods:** Using ethnographic methodology, 87 patient-physiotherapist consultations were observed and video-recorded, and 17 interviews were undertaken with patients and physiotherapists separately in Switzerland. The data was transcribed verbatim and analysed using thematic analysis. Result: Five themes emerged from the data: activity structure, adherence as a non-issue, indirectly reviewed adherence, practitioner-centred communication model, and bio-medical focus

**Conclusion:** A mix of patient-, physiotherapist- and therapy-related factors influence patient-physiotherapist interaction regarding home exercise adherence. Further research is needed to validate which factors actually influence home exercise adherence. The adherence problem should be minimized through teaching, training, education, research and finally translating this knowledge into physiotherapy practice.

Practical implications: Home exercise program (HEP) needs to be simple, individual, fit into daily routine and linked to patient's preferences and goal. Clear instruction, demonstration, practice and repetition enhance patient's confidence in doing their HEP and therefore improves adherence.

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# Patient Satisfaction With Physical Therapists: A Cross-Sectional Observation Study on Associations With Therapeutic Alliance and Shared Decision Making

Co-Autoren

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**Objective:** The aims of this study were to evaluate a) the existence of a correlation between patient satisfaction with physical therapists and therapeutic alliance (TA), b) the correlation between patient satisfaction with physical therapists and shared decision making (SDM) and c) which of the following characteristics: TA, SDM, age and gender has the strongest association with patient satisfaction with physical therapists.

**Methods:** We assessed the objectives mentioned above using three questionnaires. To examine the correlations the Spearman Correlation test was applied. Furthermore, a regression model was built to investigate which characteristic: TA, SDM, age and gender has the greatest influence on patient satisfaction.

**Results:** A strong correlation ( $r= 0.57$ ) of patient satisfaction with physical therapists and TA was observed. The association between patient satisfaction with physical therapists and SDM was moderate ( $r=0.35$ ). In the ordinal regression analysis only TA was statistically significant.

**Conclusion:** TA is an appropriate concept to increase patient satisfaction with physical therapists. The findings of our study illustrate the uncertainty of SDM improving patient satisfaction with physical therapists.

**Practice Implications:** Including TA in curricula of physical therapists' education and adapting implementation strategies from other health care professions could possibly support the integration of TA in physical therapy.

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